

# THE IRON AGE

Established  
1855

New York, August 25, 1910

VOL. 86: No. 8

Published Every Thursday by the  
**DAVID WILLIAMS COMPANY**  
14-16 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, \$5.00 per Annum; to Canada,  
\$7.50 per Annum; to Other Foreign Countries, \$10.00 per Annum.  
Single Copies, 20 Cents.

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## A Waiting Market

### A More Cheerful Tone Becoming Perceptible

While actual business shows little improvement, a notably better feeling pervades the market on finished products. A more cheerful tone is perceptible in the reports received from every section. Inquiries are becoming more numerous, indicating that the usual improvement to be expected in the fall months is at hand. Specifications on contracts are good in all finished lines and special pressure is observed for deliveries of rails. Stocks of manufactured products are being reduced throughout the country and must shortly be replenished. Prices of all finished steel products are firm, except, perhaps, light sheets, even though new business is not active.

A turn for the better is manifested in structural material, both plain and fabricated. It is asserted with apparently good foundation that structural contracts cannot now be placed as low as two weeks ago and that buyers who were waiting for still lower prices have lost their opportunity for this fall at least. It is announced that bids for the Quebec Bridge, which may require 75,000 tons of steel, will be opened October 1, instead of September 1. Competition on this work will be sharp, but it is hoped that the contract will come to American manufacturers.

So far as the volume of new business is concerned, the wire trade stands first. This is the season for the sale of wire products, and the demand is excellent. Tubular goods come second best on the list. The leading interest has just taken contracts for 35 miles of 18-in., 25 miles of 20-in. and about 25 miles of 16-in. line pipe, while the general demand is excellent. The tin plate mills, with the exception of those closed by labor troubles, are running to full capacity, but largely on old orders.

Sales of pig iron have been light, but inquiries are now being received in the Pittsburgh and Chicago markets for considerable tonnages. Consumers are beginning to show more interest in covering their requirements up to the first or second quarter of next year. It is understood that the very large inquiry from a Western agricultural implement manufacturer which appeared in the market some time ago and was then withdrawn has been renewed.

Furnace companies are not disposed to sell much pig iron for forward delivery at present prices, as there is little or no margin of profit on such sales. The fact that prices are now down to cost or below it is indicated by the stubbornness shown against further recessions for the past two or three weeks. It must be admitted, however, that there seems to be faint chance of higher prices while stocks of pig iron in furnace yards continue as large as at present. The blowing out of more furnaces would certainly help the situation.

The coal situation in Illinois is beginning to cause concern among manufacturers and other industrial

buyers of Illinois coal. The mines of that State, which normally produce over 50,000,000 tons annually, have been closed since April 1 by a disagreement over coal miners' wages, and there seems to be no hope of an early settlement. Winter is approaching and the large production of Illinois will then be imperatively needed.

Iron ore shipments down the lakes are falling off still further and more vessels are being laid up because there are not enough cargoes to go round.

Scarcity of water has caused some inconvenience at Youngstown, Ohio, and for this reason reports of the closing of mills there should not be taken to mean lack of business. Cessation of operations would merely be temporary, awaiting the accumulation of a better supply.

Copper is in less active demand and prices are therefore not so strong, but efforts by buyers to shade recent quotations have not met with much success. Spelter is firmer, as producers seem to have the situation well in hand.

### Tariff Agitation in Three Countries

Simultaneously, the tariff question is being brought to the front in Germany, Canada and the United States. In each country an agitation in favor of lower duties, much more pronounced than the work regularly carried on by free trade organizations, is now commanding attention. It seems but a short time since highly protective duties appeared to have been accepted as a correct national policy by the civilized world, and even Great Britain was looked upon as likely to fall in line. The nations which have revised their tariffs in recent years have not to any extent thrown open their home markets to their foreign competitors. On the contrary, care has been taken to provide even greater defense in tariff protection when an industry seemed to be in any need of it. But there has been a somewhat sudden revulsion of feeling in regard to this matter, especially in the three countries named.

The movement in Germany is characterized as a "revolt against protection," the protective policy being held responsible for the control of the leading industries by syndicates. We have large consolidations in the United States, and probably in some branches of trade we have combinations controlling output and prices, but at no time in our history were trade combinations so numerous and powerful as they have for years been in Germany. The latest returns regarding German syndicates show a total of 385, of which 19 cover the coal trade, 62 the iron and steel trades, 11 the metal industry other than iron, 46 the chemical industry and 31 the textile industry. These syndicates have exerted a powerful influence in the maintenance of domestic prices and in steadying trade by the allotment to each member of a specific share of it, but in addition they have performed a useful function in stimulating the German export trade by a system of bounties paid out of a fund provided for that purpose by each syndicate. These bounties are regulated according to the condition of trade at home and abroad, being increased when home trade falls off or foreign prices decline, but diminished when home trade is good or foreign prices rise. There are, however, numerous German industries dependent upon the syndicates for their supply of ma-

terial and it is largely from these industries that the demand comes for a reduction of tariff duties. They claim that the duties enable the syndicates to raise their prices unduly, thus compelling outside industries to pay too much for materials which they use for the production of articles that must be sold at prices prevailing in the world's market. They further claim that their competitors in other countries are often the beneficiaries of the bounty system on exports which is maintained by the syndicates, thus securing German material cheaper than it can be bought in Germany and making competition in neutral markets much more severe than it would be otherwise. These smaller German manufacturers therefore assert that their condition is worse under protective duties than it would be under free trade. The Hansa League, which is working for "equal opportunities and rights for the commercial and industrial classes," is stated to be organized in 450 branches and 22 State federations and numbers among its members no less than 220 important commercial associations. The movement is thus a formidable one.

In Canada dissatisfaction with protective duties has always existed among the farmers. Agricultural associations have seldom met without adopting as part of their proceedings resolutions against bounties and the tariff on manufactured products. The Canadian Government has grown accustomed to this. But in recent years a new country has been developed in the Northwest, the population there is growing rapidly, and from that section comes a demand for lower duties which is far more insistent and aggressive than the deliverances of the agricultural associations. The people of Manitoba, Saskatchewan and Alberta have given Sir Wilfrid Laurier some uneasy experiences during his trip through those provinces when they urged him to give the country a lower tariff and to establish closer trade relations with the United States. This year they are suffering from short crops and regard high prices for manufactured articles a grievance. What they especially desire is cheaper agricultural machinery, but they would also like to get other things cheaper. The Premier declared his Government ready to enter into reciprocity with the United States in natural products. This would cover grain, fish, coal, farm products and possibly pianos and wagons. But they reminded him that the United States tariff law provides for the free admission of agricultural implements from countries granting free entry to American farm implements and urged him to take advantage of this provision. He replied that if the Americans are willing to show their good faith by agreeing that the reciprocal arrangement shall extend to parts ordered for repairs, he would gladly enter into such a compact. It is unlikely, however, that the Canadian Northwest will be appeased by this concession, if it should be secured, but will press for further tariff changes.

In this country we have the unique development of a demand for a more radical revision of duties coming from members of the political party responsible for the revision enacted into law only a year ago. The opposition party always attacks vigorously a new tariff, but this is perhaps the first instance in our history of such a demonstration by important members of the dominant party. While the demand comes mainly from the West, the movement has some influential supporters in the East. As the insurgents claim that they



are in favor of a reasonable degree of protection to American products, it would seem to be a battle over rates and not a contest as to principles.

### Our Blast Furnace Capacity

The American Iron and Steel Association, in its *Bulletin* of August 15, gives most important details relative to new blast furnace construction. These statistics show the vigorous manner in which the iron trade met the demand for increased blast furnace capacity, which was such a conspicuous feature of the flush times of 1906-7. It will be recalled that the consumptive demand for pig iron was at that time so much in excess of the output of domestic blast furnaces, then running to their highest efficiency, that it was necessary to import considerable quantities of pig iron. From November 1, 1907, to June 30 of this year 35 blast furnaces, with a total annual capacity of 4,468,000 gross tons, were completed, while in that same period 12 furnaces, with a capacity of 287,000 tons, were abandoned or dismantled. This shows a net increase in capacity of 4,181,000 tons.

This tremendous addition to the blast furnace capacity of the country would certainly be more than ample for the requirements of the trade, if not another furnace was to be built for some little time. The impetus of the good times of 1906-7, however, was not exhausted by June 30 last, but at that time 16 more furnaces, with a total annual capacity of 2,083,500 tons, were in course of erection, of which two have since been blown in, having a capacity of 282,500 tons. In September three more are expected to be ready for operation, and another before the close of 1910, while the remainder of these furnaces in course of construction will be ready for operation in 1911, some of them very early in that year.

General Manager James M. Swank of the American Iron and Steel Association puts the approximate live capacity of blast furnaces, June 30 last, at 38,144,900 tons. Those which were expected to be completed in the remainder of this year are estimated to have a capacity of 728,500 tons. The approximate live capacity at the end of 1911 is placed at 40,228,400 tons.

It is difficult, indeed, to forecast the future of the American iron trade. At various times, after even short periods of depression, the consumption of pig iron in this country has advanced by leaps and bounds, surprising even the most sanguine by its tremendous gain. For instance, from 1903 to 1905 there was a gain in consumption of nearly 5,000,000 tons, the intervening year, 1904, having been a period of depression. It would seem, however, that our blast furnace capacity in 1911 will be sufficiently great to meet the requirements of the country much better than after any previous period of increased furnace construction. The highest level of consumption of pig iron ever attained in the United States was during the latter part of 1909 and early in 1910, when for a brief time the consumption appeared to be running close to the production. At that time the output of all kinds of pig iron was quite well sustained for a few months at the level of about 31,500,000 tons a year. Consideration of these figures would indicate to pig iron consumers a quite comfortable margin of expanding capacity to meet the requirements of expanding trade.

### Extravagance Representing Real Loss

It is easy to throw the blame for something on the shoulders of the other man. For instance, a banker in discussing the apparent lack of capital for investment in bonds and other securities will name among the causes the general extravagance of the people, and will, perhaps, enumerate as one of the most deplorable examples of extravagance the widespread purchase of automobiles. After delivering himself in this way he will betake himself to Europe and will probably spend from \$1000 to \$5000 on his little summer outing.

Now, if men of this kind seriously believe that individual extravagance is much to blame for the indifferent market for bonds and other securities, they should begin with their own personal extravagances and cut them down, especially those which represent a complete loss to the country. The cost of a trip abroad is so much money absolutely withdrawn from the United States. No part of it comes back here in any way, shape or form. The abused purchaser of an automobile, however, will probably buy an American machine, which represents in its entirety money paid out to American purchasers of materials and to American labor, and, therefore, means the distribution of this money through various channels of home trade. Part of the amount represented in the purchase of an automobile must lodge somewhere along the line in the hands of a person who will save a portion of it for investment. There are certainly other methods of spending money which mean a greater loss to the country as a whole than the purchase of automobiles or other American-made luxuries.

### Midsummer Canadian Pig Iron Statistics

The American Iron and Steel Association has received direct from the manufacturers statistics of the production of pig iron in Canada in the first six months of 1910.

**Total Production.**—The total production of all kinds of pig iron in the Dominion in the first half of 1910 amounted to 376,271 gross tons, as compared with 327,449 tons in the last half of 1909 and 349,641 tons in the first half. This is an increase of 48,822 tons as compared with the last half of 1909 and of 26,630 tons as compared with the first half. The production in the first half of 1910 was the greatest in any half year.

**Classified Production.**—The production of Bessemer pig iron in the first half of 1910 amounted to 129,208 tons, against 69,906 tons in the last half of 1909 and 99,639 tons in the first half of that year. The production of basic pig iron in the first half of 1910 amounted to 165,984 tons, against 192,853 tons in the last half of 1909 and 165,112 tons in the first half.

**Furnaces in Blast.**—On June 30, 1910, Canada had 16 completed blast furnaces, of which 12 were in blast and 4 were idle. Of this total 12 were equipped to use coke and 4 to use charcoal. In addition 3 coke furnaces were being built and 1 coke furnace had been partly erected and its construction indefinitely suspended.

**New Furnaces.**—The Dominion Steel Company, Sydney, Nova Scotia, is erecting a fifth blast furnace, to be 20 x 85 ft., which will probably be ready for blast in March, 1911, and will have an annual capacity of about 100,000 tons of basic and foundry pig iron. The Algoma Steel Company, Sault Ste. Marie, Ontario, expects to have its third furnace completed and ready for blast in December, 1910; it will be 21½ x 90 ft., and will have an annual capacity of about 150,-

000 tons of Bessemer and basic pig iron. The Canada Iron Corporation is adding a second blast furnace to its Midland plant, at Midland, Ontario, which will be 17¾ x 75 ft., will have an annual capacity of 90,000 tons, and is to be ready for blast this month.

Working Hours 60 Years Ago

The Schedule of Lucian Sharpe, Founder of the Brown & Sharpe Mfg. Company, When He Began Work in 1847

The schedule of working hours shown herewith was that of Lucian Sharpe, one of the founders of the Brown & Sharpe Mfg. Company, Providence, R. I., and gives the hours of labor which were required of

were the hours of daylight. Apparently, artificial illumination was practically unknown. If employed at all, it was wholly inadequate. Sanitary conditions were not good when considered by modern standards. In the winter shops were heated by wood burning stoves, and only a small proportion of the factory floor space came within the zone of comfortable warmth. Windows were small, and except during times of strongest sunlight men worked under a strain as regards their eyes. The Providence Machine Company manufactured cotton machinery, and doubtless its schedule was made to conform to that of the cotton mills. Hours of industrial employment generally were fashioned on those of the farm.

A comparison of wages is hardly possible. To-day men receive considerably more money for a shorter period of work, but the buying power of money was very different then than now, and the wants of work-

Providence Machine Company's Time Regulations.

|   | Bell-rings<br>for work<br>to commence | Bell<br>rings for<br>breakfast | Bell-rings<br>for future<br>to work | Bell<br>rings for<br>dinner | Bell-rings<br>for return<br>to work | Work<br>ceases | No. of<br>hours<br>work |
|---|---------------------------------------|--------------------------------|-------------------------------------|-----------------------------|-------------------------------------|----------------|-------------------------|
| Jan. & Feb.                                     | Sunrise                               | —                              | —                                   | 12.30                       | 1.10                                | 7.             | 11.15 to 12.9           |
| March 1 <sup>st</sup> to 20 <sup>th</sup>       | Sunrise                               | 7.30                           | 8.10                                | 12.30                       | 1.10                                | 7.             | 10.14 to 11.12          |
| March 20 <sup>th</sup> to Apr. 30 <sup>th</sup> | Sunrise                               | 7.                             | 7.40                                | 12.                         | 12.40                               | Sunset         | 10.42 to 12.34          |
| May, June, and July                             | 4.55                                  | 6.30                           | 7.10                                | 12.                         | 12.55                               | 6.45           | 12.5                    |
| Aug. 1 <sup>st</sup> to 15 <sup>th</sup>        | Sunrise                               | 6.30                           | 7.10                                | 12.                         | 12.55                               | 6.45           | 12.8 to 11.54           |
| Aug. 15 <sup>th</sup> to Sept. 20 <sup>th</sup> | Sunrise                               | 7.                             | 7.40                                | 12.                         | 12.55                               | Sunset         | 12.9 to 11.55           |
| Sept. 20 <sup>th</sup> to Oct. 30 <sup>th</sup> | Sunrise                               | 7.30                           | 8.10                                | 12.30                       | 1.10                                | 7.             | 11.30 to 10.43          |
| Nov. and Dec.                                   | Sunrise                               | —                              | —                                   | 12.30                       | 1.10                                | 7.             | 12.12 to 11.6           |

Breakfast before commencing work in Nov. Dec. Jan & Feb. .

him when he was employed by the Providence Machine Company in 1847-48. The original, in the handwriting of Mr. Sharpe, now hangs in the office of his son, the present treasurer of the company. No stronger commentary could be made of the extraordinarily rapid evolution in industrial conditions which has characterized the last 60 years.

The twentieth century employee of any machine shop would stand aghast were he asked to work such hours. Only upon a farm would they be tolerated. Not only was the average of hours of actual employment very high, but the total time consumed from the hour of beginning labor in the morning until the hour of closing at night covered practically all of each day. No period of recreation was possible. A man had little time except that required for labor and sleep. To begin work before 5 o'clock in the morning, as was the case in May, June and July, and end it at nearly 7 o'clock in the evening meant close to 14 hours, during which the workman was away from his home except during the brief intervals for meals. The only limits

men were much simpler and less expensive. Their savings brought them a much larger percentage of income. Nevertheless, the comparison is highly in favor of the employee of the present day, because, while he spends a good deal more money, he lives in far greater comfort than his predecessor of the middle of the nineteenth century. His investments may net him a smaller dividend, but he is able to do very much more for his dependents. In a vast number of cases his children are educated to be much more important factors in industry than he is, for they are given advantages of education which he did not have. From the standpoint of longevity and comfort and pleasure, the conditions surrounding his existence are immeasurably better. He shares with his employer a daily period of leisure. In many cases the hours of daylight which are his own are devoted to tilling a little farm in the country or a garden in the city. When criticism is heard of isolated cases where hours of employment are long, it is well to hark back to the time when every man worked as long as or longer than the exceptions do to-day.



# The Iron and Metal Markets

## A Comparison of Prices

Advances Over the Previous Month in Heavy Type,  
Declines in Italics.

At date, one week, one month and one year previous.

|  | Aug. 24, 1910. | Aug. 17, 1910. | July 27, 1910. | Aug. 25, 1909. |
|--|----------------|----------------|----------------|----------------|
| <b>PIG IRON, Per Gross Ton:</b>            |                |                |                |                |
| Foundry No. 2, standard, Philadelphia..... | \$16.00        | \$16.00        | \$16.25        | \$17.25        |
| Foundry No. 2, Southern, Cincinnati.....   | 14.25          | 14.25          | 14.75          | 16.75          |
| Foundry No. 2, local, Chicago.....         | 16.50          | 16.50          | 16.50          | 17.50          |
| Basic, delivered, eastern Pa....           | 15.00          | 15.00          | 15.50          | 17.50          |
| Basic, Valley furnace.....                 | 14.00          | 14.00          | 14.50          | 15.25          |
| Bessemer, Pittsburgh.....                  | 15.90          | 16.15          | 16.40          | 17.40          |
| Gray forge, Pittsburgh.....                | 14.15          | 14.25          | 14.40          | 15.85          |
| Lake Superior charcoal, Chicago            | 18.50          | 18.50          | 18.50          | 19.50          |

|   |       |       |       |       |
|---|-------|-------|-------|-------|
| <b>BILLETS, &amp;c., Per Gross Ton:</b> |       |       |       |       |
| Bessemer billets, Pittsburgh.....       | 24.50 | 24.50 | 24.50 | 24.50 |
| Forging billets, Pittsburgh.....        | 29.50 | 30.00 | 30.00 | 28.00 |
| Open hearth billets, Philadelphia       | 27.50 | 27.50 | 28.50 | 27.00 |
| Wire rods, Pittsburgh.....              | 28.00 | 28.00 | 29.00 | 31.00 |
| Steel rails, heavy, at mill.....        | 28.00 | 28.00 | 28.00 | 28.00 |

|                                     |       |       |       |       |
|-------------------------------------|-------|-------|-------|-------|
| <b>OLD MATERIAL, Per Gross Ton:</b> |       |       |       |       |
| Steel rails, melting, Chicago....   | 13.50 | 13.50 | 13.00 | 16.00 |
| Steel rails, melting, Philadelphia  | 13.75 | 13.75 | 14.00 | 17.00 |
| Iron rails, Chicago.....            | 16.00 | 16.00 | 16.50 | 19.00 |
| Iron rails, Philadelphia.....       | 18.00 | 18.00 | 18.00 | 19.75 |
| Car wheels, Chicago.....            | 14.50 | 14.50 | 14.75 | 17.00 |
| Car wheels, Philadelphia.....       | 13.75 | 14.00 | 14.00 | 16.00 |
| Heavy steel scrap, Pittsburgh.....  | 14.25 | 14.25 | 14.00 | 16.75 |
| Heavy steel scrap, Chicago.....     | 12.25 | 12.25 | 12.25 | 15.50 |
| Heavy steel scrap, Philadelphia.    | 13.75 | 13.75 | 14.00 | 17.00 |

|                                   |        |        |        |        |
|-----------------------------------|--------|--------|--------|--------|
| <b>FINISHED IRON AND STEEL,</b>   |        |        |        |        |
| Per Pound:                        | Cents. | Cents. | Cents. | Cents. |
| Refined iron bars, Philadelphia.  | 1.40   | 1.42½  | 1.42½  | 1.47   |
| Common iron bars, Chicago....     | 1.37½  | 1.40   | 1.40   | 1.40   |
| Common iron bars, Pittsburgh..    | 1.45   | 1.45   | 1.50   | 1.50   |
| Steel bars, tidewater, New York.  | 1.56   | 1.56   | 1.61   | 1.51   |
| Steel bars, Pittsburgh.....       | 1.40   | 1.40   | 1.45   | 1.35   |
| Tank plates, tidewater, New York  | 1.56   | 1.56   | 1.56   | 1.56   |
| Tank plates, Pittsburgh.....      | 1.40   | 1.40   | 1.40   | 1.40   |
| Beams, tidewater, New York....    | 1.56   | 1.56   | 1.56   | 1.56   |
| Beams, Pittsburgh.....            | 1.40   | 1.40   | 1.40   | 1.40   |
| Angles, tidewater, New York....   | 1.56   | 1.56   | 1.56   | 1.56   |
| Angles, Pittsburgh.....           | 1.40   | 1.40   | 1.40   | 1.40   |
| Skelp, grooved steel, Pittsburgh. | 1.45   | 1.50   | 1.50   | 1.40   |
| Skelp, sheared steel, Pittsburgh. | 1.55   | 1.60   | 1.60   | 1.50   |

|                                   |        |        |        |        |
|-----------------------------------|--------|--------|--------|--------|
| <b>SHEETS, NAILS AND WIRE,</b>    |        |        |        |        |
| Per Pound:                        | Cents. | Cents. | Cents. | Cents. |
| Sheets, black, No. 28, Pittsburgh | 2.20   | 2.20   | 2.25   | 2.20   |
| Wire nails, Pittsburgh.....       | 1.70   | 1.70   | 1.70   | 1.80   |
| Cut nails, Pittsburgh.....        | 1.65   | 1.65   | 1.70   | 1.75   |
| Barb wire, galv., Pittsburgh*...  | 2.00   | 2.00   | 2.00   | 2.10   |

|                                  |        |        |        |        |
|----------------------------------|--------|--------|--------|--------|
| <b>METALS, Per Pound:</b>        |        |        |        |        |
| Lake copper, New York.....       | 13.00  | 13.00  | 12.62½ | 13.50  |
| Electrolytic copper, New York..  | 12.62½ | 12.62½ | 12.50  | 13.25  |
| Spelter, New York.....           | 5.35   | 5.20   | 5.20   | 5.85   |
| Spelter, St. Louis.....          | 5.20   | 5.05   | 5.05   | 5.70   |
| Lead, New York.....              | 4.40   | 4.40   | 4.40   | 4.40   |
| Lead, St. Louis.....             | 4.30   | 4.30   | 4.25   | 4.32½  |
| Tin, New York.....               | 34.50  | 33.85  | 33.25  | 30.45  |
| Antimony, Hallett, New York....  | 7.87½  | 7.95   | 8.00   | 8.00   |
| Nickel, New York.....            | 45.00  | 45.00  | 45.00  | 45.00  |
| Tin plate, 100 lb., New York.... | \$3.84 | \$3.84 | \$3.84 | \$3.84 |

\* These prices are for largest lots to jobbers.

## Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

**Structural Material.**—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c. net; I-beams over 15 in., 1.50c. to 1.55c. net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.40c. to 1.45c. net; angles over 6 in., 1.50c. to 1.55c. net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.45c. plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.40c. to 1.45c. net; zees, 3 in. and up, 1.40c. to 1.45c. net; angles, channels and tees, under 3 in., 1.45c. base, plus full extras as per steel bar card of September 1,

1909; deck beams and bulb angles, 1.70c. to 1.75c. net; hand rail tees, 2.50c. net; checkered and corrugated plates, 2.50c. net.

**Plates.**—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

|   |        |
|---|--------|
| Gauges under ¼-in. to and including 3-16-in. on thinnest edge.....            | \$0.10 |
| Gauges under 3-16-in. to and including No. 8.....                             | .15    |
| Gauges under No. 8 to and including No. 9.....                                | .25    |
| Gauges under No. 9 to and including No. 10.....                               | .30    |
| Gauges under No. 10 to and including No. 12.....                              | .40    |
| Sketches (including all straight taper plates), 3 ft. and over in length..... | .10    |
| Complete circles, 3 ft. diameter and over.....                                | .20    |
| Boiler and flange steel.....  | .10    |
| "A. B. M. A." and ordinary firebox steel.....                                 | .20    |
| Still bottom steel.....   | .30    |
| Marine steel.....   | .40    |
| Locomotive firebox steel.....   | .50    |
| Widths over 100 in. up to 110 in., inclusive.....                             | .05    |
| Widths over 110 in. up to 115 in., inclusive.....                             | .10    |
| Widths over 115 in. up to 120 in., inclusive.....                             | .15    |
| Widths over 120 in. up to 125 in., inclusive.....                             | .25    |
| Widths over 125 in. up to 130 in., inclusive.....                             | .50    |
| Widths over 130 in.....   | 1.00   |
| Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive.....          | .25    |
| Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....          | .50    |
| Cutting to lengths or diameters under 1 ft.....                               | 1.55   |
| No charge for cutting rectangular plates to lengths 3 ft. and over.           |        |

TERMS.—Net cash 30 days.

**Sheets.**—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets: Nos. 17 and 21, 2.05c.; Nos. 22 to 24, 2.10c.; Nos. 25 and 26, 2.15c. to 2.20c.; No. 27, 2.15c. to 2.20c.; No. 28, 2.20c. to 2.25c.; No. 29, 2.25c. to 2.30c.; No. 30, 2.35c. to 2.40c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.55c.; Nos. 17 to 21, 2.70c.; Nos. 22 to 24, 2.85c.; Nos. 25 and 26, 3c. to 3.05c.; No. 27, 3.10c. to 3.15c.; No. 28, 3.30c. to 3.35c.; No. 29, 3.45c. to 3.50c.; No. 30, 3.65c. to 3.70c. Painted roofing sheets, No. 28, \$1.65 per square. Galvanized roofing sheets, No. 28, \$3 per square, for 2½-in. corrugations.

**Wrought Pipe.**—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe now in effect:

|                                  | Steel. |       | Iron.  |       |
|----------------------------------|--------|-------|--------|-------|
|                                  | Black. | Galv. | Black. | Galv. |
| ½ and ¾ in.....                  | .70    | .54   | .66    | .53   |
| ¾ in.....                        | .71    | .57   | .67    | .53   |
| 1 in.....                        | .74    | .62   | .70    | .58   |
| 1½ to 6 in.....                  | .78    | .68   | .74    | .64   |
| 7 to 12 in.....                  | .72    | .57   | .68    | .53   |
| Plugged and Reamed.              |        |       |        |       |
| 1 to 4 in.....                   | .76    | .66   | .72    | .62   |
| Extra Strong, Plain Ends.        |        |       |        |       |
| ½ to ¾ in.....                   | .63    | .51   | .50    | .47   |
| ¾ to 4 in.....                   | .70    | .58   | .66    | .54   |
| 4½ to 8 in.....                  | .66    | .54   | .62    | .50   |
| 9, 10, 11 and 12 in.....         | .54    | .42   | ..     | ..    |
| Double Extra Strong, Plain Ends. |        |       |        |       |
| ½ to 8 in.....                   | .59    | .48   | .55    | .44   |

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

**Boiler Tubes.**—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

|  | Steel. | Iron. |
|--|--------|-------|
| 1 to 1½ in.....  | .49    | .43   |
| 1½ to 2¼ in.....   | .61    | .43   |
| 2½ in.....   | .63    | .48   |
| 2½ to 5 in.....  | .69    | .55   |
| 6 to 13 in.....  | .61    | .43   |
| 2½ in. and smaller, over 18 ft., 10 per cent. net extra. |        |       |
| 2½ in. and larger, over 22 ft., 10 per cent. net extra.  |        |       |

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

**Wire Rods.**—Bessemer rods, \$28 to \$28.50; open hearth and chain rods, \$28.50 to \$29.

**Steel Rivets.**—Structural rivets, ¼-in. and larger, 1.90c., base; cone head boiler rivets, ¼-in. and larger, 2c., base; ½-in. and 11-16-in. take an advance of 15c., and ¾-in. and 9-16-in. take an advance of 50c.; in lengths shorter than 1-in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

# THE IRON AND METAL MARKETS

## Pittsburgh

PARK BUILDING, August 24, 1910.—(By Telegraph.)

**Pig Iron.**—The very low prices ruling for Bessemer and basic iron, and, in fact, all grades, have brought out considerable inquiry in the past week; at present, it is said, there are inquiries for 30,000 to 40,000 tons of Bessemer and basic iron, and also for a considerable tonnage of foundry iron. The furnaces are not willing to sell iron for extended delivery at to-day's prices, believing that later in the year and possibly within a month or two the pig iron market may improve. Stocks of pig iron in the furnace yards are very heavy and production is still heavier than consumption, so that under these conditions improvement in prices can hardly be expected in the near future. A sale of 1000 tons of standard Bessemer iron for prompt delivery was made at \$15, Valley furnace, and also a sale of 1000 tons of basic at about \$14, Valley, and another 1000 tons at a slightly lower price. We quote Bessemer iron at \$15 to \$15.25; basic, \$14; Northern No. 2 foundry, \$14; Northern gray forge, \$13.25 to \$13.35, and malleable Bessemer, \$14.50, all Valley furnace, the freight rate to Pittsburgh being 90c. a ton.

**Steel.**—There is considerable new inquiry for billets and sheet bars, probably due partly to the lower prices that are ruling. Several sheet and tin plate plants have covered their requirements on sheet and tin bars for the balance of this year. We note a sale of 300 to 400 tons of forging billets at \$29.50, Pittsburgh. We quote Bessemer billets at \$24.50; Bessemer sheet bars, \$25.50; open hearth billets, \$25.50 to \$26; open hearth sheet bars, \$26.50, and forging billets, \$29.50 to \$30, all f.o.b. Pittsburgh, Wheeling or Youngstown districts.

(By Mail.)

While there is nothing tangible in the way of large contracts or increased sales on which to base the statement, the feeling in the iron market is more hopeful and prices are showing a stronger tone. The feeling is growing among the large steel interests that to yield any further in the direction of lower prices would be a mistake, and it is argued that the market is plenty low enough to warrant consumers in taking hold. A large contract for plates of desirable sizes to roll was offered to two or three of the leading plate mills at \$1 a ton under the regular price, but the business was refused by all three mills. It is not believed that further reductions in prices would stimulate buying, and there is a strong feeling that the steel interests have decided to stand pat on the present market, and if business cannot be secured at to-day's prices to do without it. In the pig iron market there is no improvement to note, new inquiry being very dull, and when actual sales are made they are usually at prices that are regarded as under the regular market. It is reported that the Oliver Chilled Plow Company of South Bend, Ind., is again feeling the market for a large block of iron made up of 10,000 tons of Bessemer, 5000 tons of basic and 5000 to 5500 tons of malleable Bessemer. This concern was in the market in June for some iron, but did not buy. One or two small sales of standard Bessemer iron have been made on the basis of \$15, Valley, and basic is obtainable at \$14, Valley. Northern No. 2 foundry has sold for delivery over remainder of this year at \$14, Valley furnace. The steel market continues quiet, with prices rather weak. A sale of 500 tons of Bessemer sheet bars was made recently by a broker at about \$25, Pittsburgh, but there were some special conditions attached to the sale which account for the low price. In finished material the new bookings of the mills are light, but specifications against contracts already booked are coming in at a fairly satisfactory rate. The billet and rail sales division of the Carnegie Steel Company reports that its specifications so far this month have been larger than during the same period in July. Several of the leading pipe mills also report that actual orders sent to the mills so far this month are larger than in the same period last month. The rod, wire and nail mills of the Pittsburgh Steel Company at Monessen, Pa., which closed down about two weeks ago, are scheduled to start again on Monday, August 29. The Carnegie Steel Company has shut down eight of the 12 open hearth furnaces at its South Works at South Sharon, Pa., and also the blooming mill at the same plant. A plate mill of one of the leading interests is also closed this week for lack of orders. While the present situation in the iron trade is not satisfactory by any means, yet it is not without encouraging features, and it is believed that within a very short time, possibly shortly after September 15, there will

be a much heavier buying movement. In the face of the light new buying prices are being remarkably well sustained.

**Ferromanganese.**—Last May and June most consumers covered their requirements in ferro for the remainder of this year, and as a result there is little or no new buying and no new inquiries are out. We quote foreign 80 per cent. ferro at \$39, Baltimore, the freight rate to Pittsburgh being \$1.95 a ton. On a firm offer and for large tonnage this price might possibly be shaded.

**Ferrosilicon.**—New inquiry is very light, most consumers having fully covered their requirements some time ago for the remainder of this year. We quote 50 per cent. ferrosilicon at \$57.50 to \$58, delivered, Pittsburgh, and blast furnace ferrosilicon as follows: \$23 for 10 per cent., \$24 for 11 per cent. and \$25 for 12 per cent., f.o.b. Jisco and Ashland furnaces.

**Rods.**—The dull condition existing in the wire and wire nail trades is reflected in rods, new inquiry being very light, while specifications against contracts are coming in at only a fairly satisfactory rate. We quote Bessemer rods at \$28 to \$28.50 and open hearth and chain rods at \$28.50 to \$29, Pittsburgh.

**Skelp.**—As yet no agreement has been reached with the Sons of Vulcan on the puddling scale, this organization asking 50c. a ton more for puddling than called for in the Amalgamated scale. As a result, a number of puddling plants in the Central West are idle and there is a decided scarcity of iron plates. We quote: Grooved and skelp, 1.45c. to 1.50c.; sheared steel skelp, 1.55c. to 1.60c.; grooved iron skelp, 1.80c. to 1.85c., and sheared iron skelp, 1.90c. to 1.95c., Pittsburgh.

**Muck Bar.**—A number of puddling plants in the Central West are closed on account of the puddling scale of the Sons of Vulcan not having been signed, and this has caused a decided scarcity in the available supply of muck bar. We are advised that offers of as high as \$29.50 to \$30, Pittsburgh, have been made for high grade muck bar for prompt shipment.

**Steel Rails.**—For domestic use, new orders booked by the Carnegie Steel Company for standard sections have been very light; but this concern has taken some nice orders for export, and, in fact, has been receiving all this year a good deal of export tonnage in standard sections, which has served to keep the Edgar Thomson rail mills running to fuller capacity than otherwise would have been the case. New demand for light rails and specifications against contracts continues quite active. We quote standard sections of Bessemer rails at \$28, mill, and light rails as follows: 8 to 10 lb., \$32; 12 to 14 lb., \$29; 16, 20 and 25 lb., \$28; 30 and 35 lb., \$27.75, and 40 and 45 lb., \$27, Pittsburgh. We quote steel axles at 1.75c. to 1.80c. and splice bars at 1.50c. at mill.

**Structural Material.**—The time for opening the bids on the Quebec Bridge have been extended for one month, or until October 1. There is quite a good run of small orders for structural material, but no large contracts in this district have been given out for some time. Reports that the Carnegie Steel Company would build structural mills at the Edgar-Thomson mills at Bessemer are officially denied. This concern has under way at present the building of a finishing shop for splice bars at Bessemer, and later on will build mills for the actual rolling of splice bars, this now being done at Duquesne. Possibly the Carnegie Steel Company will build a mill at Bessemer on which steel rails, sheet bars and tie plates can be rolled. There is not enough business in rails being placed to take the output of the Edgar-Thomson steel mills, and some other finishing mills will be erected at this plant, possibly next year, that will take care of the surplus output in steel. We quote beams and channels, 15-in. and under, at 1.40c. to 1.45c., Pittsburgh.

**Plates.**—The largest job in the market at present is the new water works for Portland, Me., bids for which are to go in by noon on September 12, and which will take about 10,000 tons of plates. There is no new buying of cars by the railroads, the only active inquiry in the market being that of the Chicago & Alton for 3000 steel cars, but it is not known now whether the order will be actually placed. The Pressed Steel Car Company is operating its steel car works at McKees Rocks and Woods Run to about full capacity, and is turning out at the two plants about 120 cars per day. This concern shipped on Monday, August 22, 133 cars and some steel under frames. General demand for plates is quiet, and several of the leading plate mills have very little work on their books, and are running one day on orders received the day before. We quote 1/4-in. and heavier plates at 1.40c. in large lots and 1.45c. in small lots. It is stated that several of the smaller plate mills that make only a limited range of sizes are offering narrow plates at 1.35c., at mill.

**Sheets.**—The sheet market continues in very unsatisfactory condition, both as regards new demand and prices.



## THE IRON AND METAL MARKETS

The trade has been expecting for some time that a new schedule of prices on a lower basis would be sent out by the leading mills, but this has not yet been done. Prices on one-pass, box annealed, black sheets are being cut \$3 to \$4 a ton, and on galvanized from \$4 to \$5 a ton. New demand is light and consumers are buying from hand to mouth to cover actual needs. Box annealed black sheets are on a basis of 2.20c. for No. 28, while No. 28 galvanized are about 3.25c. at mill, in carload and larger lots. On painted and galvanized roofing material prices are also being materially shaded. Present prices in effect on black, galvanized and roofing sheets are printed on a previous page.

**Tin Plate.**—New orders being placed for tin plate are light, as this is always the dull season of the year, but the mills are booked for four or five months ahead and consumers are specifying very freely against their contracts. The output of tin plate by the American Sheet & Tin Plate Company is heavier than ever before in its history, this in spite of the fact that two of its leading plants, the La Belle at Wheeling and the Laughlin plant at Martin's Ferry, are both idle. All the leading tin plate mills are more or less behind in deliveries, and there is difficulty in finding mills that can take orders for reasonably prompt shipment. There has been a very notable increase in capacity for making tin plate in the Pittsburgh district in the past year, fully 50 or more new hot mills having been erected in this district, but in spite of this all the tin plate plants in the Pittsburgh district, with one exception, are running to full capacity and booked for some months ahead. The market is very firm, and we quote 100-lb. cokes at \$3.60 per base box, f.o.b. Pittsburgh. It is stated that on some small orders for tin plate for prompt shipment placed recently, 10c. to 15c. per box premium was paid.

**Bars.**—New demand for both iron and steel bars is relatively light, but specifications against contracts from the implement and wagon builders for steel bars are coming in freely and shipments by the mills are heavy. The puddling scale of the Sons of Vulcan, which calls for an advance of 50c. per ton over the Amalgamated scale for boiling, has not been signed, and as a result the output of iron bars in the Pittsburgh district is lighter at present than for some months. The leading steel bar mills are pretty well filled up with contracts over the next 60 days, but in iron bars the mills are not so well filled. We quote steel bars at 1.40c. in large lots and 1.45c. in small lots, while iron bars range from 1.45c. to 1.50c., f.o.b. Pittsburgh.

**Spelter.**—The market is firm and slightly higher prices prevail, new demand being reported better than for some time. We quote prime grades of Western spelter at 5.15c., East St. Louis, or 5.27½c., Pittsburgh.

**Hoops and Bands.**—New orders being placed for both hoops and bands are relatively light, consumers pursuing the policy of buying conservatively and only in large enough quantities to cover actual needs. Specifications against contracts made prior to July 1, but which were not taken out, and also on some contracts made after July 1, are coming in at a satisfactory rate. We quote hoops at 1.50c. to 1.55c. and bands at 1.40c. to 1.45c., the latter carrying extras as per the steel bar card.

**Spikes.**—New demand is light, but in the past week a local spike mill has received contracts for about 3000 kegs of railroad spikes for the Chicago, Milwaukee & St. Paul and about 800 kegs for the Pan Handle railroads. We quote standard sizes of railroad spikes at 1.50c. to 1.55c., for Western shipment, and 1.55c. to 1.60c. for local trade. New demand for small railroad and boat spikes is only fair, buyers placing orders only for small lots to cover actual needs. We quote small railroad and boat spikes at 1.60c. to 1.65c., base, in carload and larger lots.

**Rivets.**—New business being placed is light and nearly altogether in small lots to cover actual needs. The official prices on structural rivets are 2.15c. and on boiler rivets 2.25c., f.o.b. Pittsburgh, but these prices continue to be more or less shaded on desirable orders.

**Shafting.**—Makers report that new demand for shafting is rather light, but specifications against contracts placed by the implement trade prior to July 1 are coming in at a very satisfactory rate. Demand from automobile makers for shafting is lighter than for some time, and the mills are pretty well caught up on back deliveries. Regular discounts on shafting remain at 55 per cent. off in carload and larger lots, and 50 per cent. off in small lots, delivered in base territory. On desirable contracts and for large lots 55 and 5 per cent. is being named.

**Wire Products.**—New demand for plain and barb wire and also for wire nails is reported to have been more active in the past week than for some time, and the mills regard this as a forerunner of the heavy demand expected with the opening up of fall trade. One leading plant making rods, wire and wire nails in the Pittsburgh district has been idle for several weeks, but is expected to start up in part at least

on Monday, August 29. New demand for cut nails is light, buyers placing orders only in small lots to cover actual needs. We quote galvanized barb wire at \$2; painted, \$1.70; annealed fence wire, \$1.50; galvanized, \$1.80; wire nails, \$1.70, and cut nails, \$1.65, in carload and larger lots, all f.o.b. Pittsburgh, freight to destination being added.

**Merchant Pipe.**—Several of the leading pipe mills report that conditions are quite satisfactory in the lap weld sizes, but are not so good in butt weld pipe. The National Tube Company has taken contracts in the past week for 35 miles of 18-in. pipe, 25 miles of 20-in. and about 25 miles of 16-in. The Philadelphia Company is reported in the market for three miles of 8-in. On the larger sizes of pipe the mills are pretty well filled for the balance of this year, but have only a relatively small amount of tonnage on their books in the butt weld sizes. Prices on both iron and steel pipe are firm, the concessions made some time ago on iron pipe have largely disappeared owing to the scarcity, and higher prices being charged for iron plates. Discounts on both iron and steel pipe, printed on a previous page, are, we are advised, being maintained.

**Boiler Tubes.**—New demand for boiler tubes is light; both from the railroads and boiler shops very few new contracts for locomotives have been placed recently, while the boiler shops are short of work, and this naturally is reflected in new demand for tubes, which has been dull for some time. Discounts on boiler tubes, printed on a previous page, continue to be shaded.

**Coke.**—A leading blast furnace interest came into the market recently for 70,000 to 80,000 tons of furnace coke for shipment over remainder of this year, but the business has not yet been placed, except that the concern in question is reported to have closed contracts for about 20,000 tons of standard blast furnace coke for shipment in September, at \$1.60 to \$1.65, in net tons, f.o.b. at oven. Aside from this there are no other inquiries in the market for blast furnace coke, and new demand for foundry coke is also quiet, the foundries either being covered by contracts or buying in small lots from month to month. The output of coke in the Upper and Lower Connellsville regions last week was 367,273 tons, a falling off over the previous week of nearly 40,000 tons. There is a decided shortage of water at some of the coke plants, and this is seriously interfering with operations. We quote standard grades of Connellsville coke for prompt shipment at \$1.60 to \$1.65, in net tons, at oven, and \$1.75 to \$1.80 on contracts for remainder of this year. We quote standard grades of 72-hour foundry coke at \$2.15 to \$2.25 for prompt shipment and \$2.25 to \$2.50 on contracts. The Jamison Coal & Coke Company is going ahead in developing its coal holdings in West Virginia and will build a large number of ovens in Marion County, the new plants to be located at Farmington, Underwood and Bar-rackville, on the Baltimore & Ohio Railroad. This concern has 6000 acres of coal land in Westmoreland County, Pa., where it now operates 1408 ovens. It is one of the largest producers of standard grades of furnace and foundry coke in the country and is practically sold up for the balance of this year on both grades.

**Iron and Steel Scrap.**—The embargo on scrap routed for Monessen, Pa., is seriously affecting the market and prices on all kinds of scrap are weak, with very little material moving to consumers. About all the actual sales in scrap that are being made are by brokers to each other to cover shorts. No sales of moment have been made in this market in the past week. Dealers quote about as follows per gross ton, f.o.b. Pittsburgh:

|  |                    |
|--|--------------------|
| Heavy steel scrap, Steubenville, Pol-lansbee, Sharon, Monessen and Pitts-burgh delivery..... | \$14.25 to \$14.50 |
| No. 1 foundry cast.....  | 14.00 to 14.25     |
| No. 2 foundry cast.....  | 13.00 to 13.25     |
| Bundled sheet scrap, at point of ship-ment.....  | 9.75 to 10.00      |
| Re-rolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.....                        | 15.75 to 16.00     |
| No. 1 railroad malleable scrap.....  | 13.75 to 14.00     |
| Grate bars.....  | 10.75 to 11.00     |
| Low phosphorus melting stock.....  | 18.00 to 18.50     |
| Iron car axles.....  | 21.00 to 21.50     |
| Steel car axles.....   | 19.00 to 19.50     |
| Locomotive axles.....  | 25.00 to 25.50     |
| No. 1 bushelling scrap.....  | 12.50 to 12.75     |
| No. 2 bushelling scrap.....  | 8.50 to 8.75       |
| Old car wheels.....  | 14.00 to 14.50     |
| Sheet bar crop ends.....   | 16.00 to 16.25     |
| Cast iron borings.....   | 7.50 to 7.75       |
| Machine shop turnings.....   | 9.25 to 9.50       |

The Wilkoff Brothers Company, Youngstown, Ohio, deal-ers in iron and steel scrap of all kinds, has purchased the plant and site of the Youngstown Car Mfg. Company, at Youngstown, Ohio, and will move its yards to the new site within a month or two. At present the Wilkoff Brothers Company has no intention of doing any manufacturing, but will continue to carry on its present business of handling iron and steel scrap and metals.

# THE IRON AND METAL MARKETS

## Chicago

FISHER BUILDING, August 24, 1910.—(By Telegraph).

Conditions in the West are more favorable this week outside of the iron and steel industry than in the direct channels of the trade. Banking conditions are a little easier and the financial strain which caused more or less uneasiness during the summer appears to be wearing off. Crop advices grow better each week. A large corn crop is expected, and later reports on wheat and other crops are more favorable than the market information of two or three months ago. These favorable conditions, however, have not taken the form of any material increase in business in iron and steel. There is a better feeling in the trade and sales managers express more confidence in the future. The bar mills are receiving good specifications on yearly contracts, but new business is not so good as two or three weeks ago. Only a small amount of new structural business was booked last week. The wire trade makes about an average showing, and there is a fair run of new business in open hearth sheets. Purchases of railroad material are still on a very small scale. The coal situation is beginning to cause concern among manufacturers and other industrial buyers. The Illinois mines, which produce over 50,000,000 tons annually under normal conditions, have been closed since April 1, owing to a failure of operators and union officials to reach an agreement. Manufacturers had generally laid in good stocks of coal before the shut-down and prices did not advance until recently. Screenings for power plants now bring a premium of 50c. over the prices of a year ago, and mine run coal is now 25c. to 50c. higher, with prospects of further advances unless the Illinois mines are reopened. The prompt resumption last spring in Ohio and other States east of Illinois furnished ample supplies of coal for the summer trade, but the large production of Illinois is needed in the West during the winter.

**Pig Iron.**—Hopes of a buying movement have been encouraged among pig iron men by the appearance the past week of inquiries for a considerable tonnage. The Southern furnace interests in Chicago have received 12 or 15 inquiries for 1000 to 2000 tons each, deliveries generally running for the last quarter of this year and the first quarter of 1911. The Northern furnace interests have many tentative inquiries for deliveries running through the first quarter or first half. No important tonnage is reported closed for delivery running beyond the end of this year. The Northern interests are unwilling to sell at current prices for any extended shipment, and it is uncertain whether the Southern interests will take much business for extended deliveries at \$11, Birmingham, except possibly on high phosphorus iron. The buyer has a considerable choice of brands at \$11 for prompt shipment, but all of the old standard brands have been held at \$11.50 or higher for the last quarter. A plow manufacturer at South Bend, Ind., whose inquiry in June for about 25,000 tons was withdrawn from the market at that time is now reported about to close for a large tonnage. The business is about equally divided between charcoal and coke iron, and a considerable part of the coke iron will be bought by analysis differing from regular No. 2, either Northern or Southern iron being available to meet the specifications. It is understood that anywhere from 20,000 to 50,000 tons will be purchased, the amount depending more upon price and other conditions than extended delivery, although contract deliveries until the third quarter of next year would be considered. Competition on this business will be close between Chicago, Toledo and Valley Furnaces and Southern iron. Chicago furnaces continue to hold \$16 as the minimum at furnace for malleable Bessemer, or No. 2 foundry of regular grades, but it is understood that they have about 10,000 tons in their furnace stock of analysis iron on which April prices have been made in the local trade. Most of this iron is Gray Forge, which is not much in demand in the Chicago market. The following quotations are for August and September shipment, Chicago delivery:

|  |                    |
|--|--------------------|
| Lake Superior charcoal.....                | \$18.50 to \$19.00 |
| Northern coke foundry, No. 1.....          | 17.00 to 17.50     |
| Northern coke foundry, No. 2.....          | 16.50 to 17.00     |
| Northern coke foundry, No. 3.....          | 16.25 to 16.50     |
| Northern Scotch, No. 1.....                | 17.50 to 18.00     |
| Southern coke, No. 1.....                  | 15.85 to 16.35     |
| Southern coke, No. 2.....                  | 15.35 to 15.85     |
| Southern coke, No. 3.....                  | 15.10 to 15.60     |
| Southern coke, No. 4.....                  | 14.85 to 15.35     |
| Southern coke, No. 1 soft.....             | 15.85 to 16.35     |
| Southern coke, No. 2 soft.....             | 15.35 to 15.85     |
| Southern gray forge.....                   | 14.60 to 15.10     |
| Southern mottled.....                      | 14.60 to 15.10     |
| Malleable Bessemer.....                    | 16.50 to 17.00     |
| Standard Bessemer.....                     | 17.65 to 18.15     |
| Jackson Co. and Kentucky silvery, 6%.....  | 19.40 to 19.90     |
| Jackson Co. and Kentucky silvery, 8%.....  | 20.40 to 20.90     |
| Jackson Co. and Kentucky silvery, 10%..... | 21.40 to 21.90     |

(By Mail.)

**Billets.**—The Chicago market is quiet but strong at \$29 to \$30, base, Chicago, for forging billets.

**Rails and Track Supplies.**—The trade is quiet, as Western roads will not be in the market for any large quantity of rails until they contract for next year's delivery.

There are several inquiries for traction rails for delivery this fall, two of them being for 2000 tons each. Owing to the condition of the bond market construction work has not been as active on interurban railroads as it might have been the past summer, but money is becoming easier for these enterprises, and more progress may be made this fall by traction companies whose plans have been held in abeyance. We quote standard railroad spikes at 1.70c. to 1.80c., base; track bolts with square nuts, 2.30c. to 2.40c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., \$26; 30 to 35 lb., \$26.75; 16, 20 and 25 lb., \$27; 12 lb., \$28, Chicago.

**Structural Material.**—Only a few small contracts were closed in the West last week. The American Bridge Company booked 200 tons of bridges for the Elgin, Joliet & Eastern Railroad and 100 tons of smelter construction for the Empire Zinc Company, near Denver. The McClintic-Marshall Construction Company took a 200-ton contract for a power station at Bakersfield, Cal., for the Pacific Gas & Electric Company. A building at Sacramento for the Folsom Investment Company, 100 tons, was let to the Palm Iron Works of that city. The agricultural building for the University of California, at Berkeley, Cal., 350 tons, was let to the Ralston Iron Works. Plans are being prepared in Chicago for a large furniture exchange building on the lake front south of Twenty-second street. The promoters of the enterprise claim to have made financial arrangements for a building which will require 14,000 tons of steel. A similar building promoted by other interests, which has been held in abeyance for some time, was planned to occupy the entire block west of the Board of Trade. There are reports of progress on plans for the new union depot in Chicago. The Pennsylvania Railroad interests, which control the plans of construction for a new union terminal west of the river, have begun wrecking all of the buildings on property owned by the company on the block north of Madison street on Canal street. It is understood that work on a new union depot will commence as soon as the northwestern terminal is completed this fall, as this will enable the old northwestern depot to be used for temporary accommodation of some of the roads now occupying the union station. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

**Plates.**—It is understood that the leading interest is holding 1.58c. as the minimum for plates in this market, but outside mills have quoted 1.35c., Pittsburgh, on a limited product of narrow sizes. We quote mill prices at 1.53c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

**Sheets.**—The demand for blue annealed sheets is holding the Chicago market firm, especially for open hearth sheets. Prices continue weak, however, on black and galvanized sheets. We quote as follows, Chicago: No. 10 annealed, 1.93c.; No. 28 black, 2.43c.; No. 28 galvanized, 3.43c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.20c. to 2.30c.; No. 28 black, 2.85c. to 2.95c.; No. 28 galvanized, 3.90c. to 4c.

**Bars.**—The merchant bar trade has been quiet the past week, so far as new business is concerned, but the improvement in crop prospects is bringing out liberal specifications from the agricultural implement manufacturers. Inquiries for concrete bars have not been so active the past few days as they were a week ago. The bar iron market continues very dull, awaiting a more liberal buying policy on the part of the railroads. Buying from store is good, and the railroads are especially active in purchasing from store small lots of all grades of bars used in repair work. It is apparently the policy of the railroads just at present to pay store prices for small lots rather than to place mill orders and wait a little longer for delivery. The mills, however, are getting a fair amount of small railroad orders for immediate shipment. We quote as follows: Soft steel bars, 1.58c. to 1.63c.; bar iron, 1.37½c. to 1.40c.; hard steel bars rolled from old rails, 1.45c. to 1.55c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

**Rods and Wire.**—The trade is moving along quietly, with orders and specifications coming in at a daily rate just about equal to the average consumption for a year. The market is free from speculative purchases. In many cases jobbers have been disappointed because they did not have an opportunity to stock up at low prices to be followed by an advance, but this feeling is slowly wearing off. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.88c.; painted barb wire, 1.88c.; galvanized, 2.18c., all Chicago.

**Merchant Steel.**—It is understood that the demand from the automobile trade will not be so urgent as it was last year, many of the largest concerns only contracting for about half the steel which they bought a year ago. In other directions, however, the demand for merchant steel is active, especially in the agricultural trade.



# THE IRON AND METAL MARKETS

**Cast Iron Pipe.**—The market is quiet and prices are quoted 50c. lower. This is the quiet season of the year in the Northern market, as buying for fall delivery is about over and it is a little early for specifications for delivery next spring. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., \$27; 6 to 12 in., \$26; 16-in. and up, \$25, with \$1 extra for gas pipe.

**Metals.**—There has been good consumptive buying of copper the past week for September and October delivery. Published reports that consumers have bought enough to cover their requirements for two or three months are not correct as to Chicago territory, as there is still a considerable amount of business pending in the Chicago market. Tin and spelter are both higher, through speculative influence, but in these metals there is not much buying by consumers at present. Lead is quiet. We quote Chicago prices as follows: Casting copper, 12 $\frac{3}{4}$ c.; lake, 13 $\frac{3}{4}$ c., in carloads, for prompt shipment; small lots,  $\frac{1}{4}$ c. to  $\frac{3}{8}$ c. higher; pig tin, car lots, 35c.; small lots, 36c.; lead, desilverized, 4.35c. to 4.40c., for 50-ton lots; corroding, 4.60c. to 4.65c., for 50-ton lots; in carloads, 2 $\frac{1}{2}$ c. per 100 lb. higher; spelter, 5.25c. to 5.30c.; Cookson's antimony, 10 $\frac{1}{4}$ c., and other grades, 9c. to 10c.; sheet zinc is \$7.50, f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12 $\frac{1}{2}$ c.; copper bottoms, 10 $\frac{1}{2}$ c.; copper clips, 11 $\frac{3}{4}$ c.; red brass, 11 $\frac{1}{2}$ c.; yellow brass, 8 $\frac{3}{4}$ c.; light brass, 6c.; lead pipe, 4 $\frac{1}{4}$ c.; zinc, 4 $\frac{1}{2}$ c.; pewter, No. 1, 24c.; tin foil, 26c.; block tin pipe, 30c.

**Old Material.**—The movement of scrap in the Chicago market is extremely slow. Country dealers are not shipping and many of the railroads have been holding back their material for two or three months, so that there is not much scrap arriving for disposition. Heavy melting steel and other closely related grades of steel scrap are holding steady, but wrought and busheling scrap are quoted lower this week. There have been no consumers in the market seeking material for a long time, as buyers have had enough bargains offered them to cover their requirements and fill their yards. Dealers' stocks in Chicago are down to a minimum. One of the three largest yard stocks in Chicago was closed out last winter and other wholesale yards are carrying only the ordinary accumulation of assorted material. There are two railroad lists out this week, one from the Chicago, Burlington & Quincy, offering about 2500 tons, and one from the Illinois Central, offering about 3000 tons. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to \$1 less in this district, owing to high switching charges. Following prices are per gross ton, delivered, Chicago:

|   |                    |
|---|--------------------|
| Old iron rails.....   | \$16.00 to \$16.50 |
| Old steel rails, rerolling.....                               | 15.25 to 15.75     |
| Old steel rails, less than 3 ft.....                          | 13.50 to 14.00     |
| Relaying rails, standard sections, subject to inspection..... | 24.00 to 25.00     |
| Old car wheels.....   | 14.50 to 15.00     |
| Heavy melting steel scrap.....                                | 12.25 to 12.75     |
| Frogs, switches and guards, cut apart.....                    | 12.25 to 12.75     |
| Shoveling steel.....  | 11.75 to 12.25     |

The following quotations are per net ton:

|   |                    |
|---|--------------------|
| Iron angles and splice bars.....            | \$14.00 to \$14.50 |
| Iron car axles.....                         | 19.50 to 20.00     |
| Steel car axles.....                        | 19.50 to 20.00     |
| No. 1 railroad wrought.....                 | 11.75 to 12.25     |
| No. 2 railroad wrought.....                 | 10.75 to 11.25     |
| Springs, knuckles and couplers.....         | 11.50 to 12.00     |
| Locomotive tires, smooth.....               | 17.00 to 17.50     |
| No. 1 dealers' forge.....                   | 10.50 to 11.00     |
| Steel axle turnings.....                    | 8.50 to 9.00       |
| Machine shop turnings.....                  | 7.00 to 7.50       |
| Cast and mixed borings.....                 | 4.75 to 5.25       |
| No. 1 busheling.....                        | 10.00 to 10.50     |
| No. 2 busheling.....                        | 8.00 to 8.50       |
| No. 1 boilers, cut to sheets and rings..... | 9.00 to 9.50       |
| No. 1 cast scrap.....                       | 12.75 to 13.25     |
| Stove plate and light cast scrap.....       | 11.00 to 11.50     |
| Railroad malleable.....                     | 11.00 to 11.50     |
| Agricultural malleable.....                 | 10.50 to 11.00     |
| Pipes and flues.....                        | 9.25 to 9.75       |

## Philadelphia

PHILADELPHIA, PA., August 23, 1910.

Extreme quietness prevails in practically every branch of the trade. Buying has been confined to small lots for immediate needs, although some further inquiry, particularly in pig iron for delivery over the remainder of the year, is to be noted. No large orders have, however, been placed, and the market presents a strong waiting appearance, with prices somewhat firmer, in that sellers generally refuse to make any further concessions. A little more interest is being shown in the steel making grades of pig iron, but no important sales have been made. The finished material situation shows no particular change, buying is largely of a hand to mouth character, with occasional sales of moderate lots. While efforts to get price concessions are still being made sellers refuse to make reductions and the market presents a slightly stronger appearance. The demand for crude

rolled products is dull, billets being inactive at unchanged prices. Very little movement is to be noted in old materials.

**Pig Iron.**—Sales have been on an extremely narrow basis, and several of the leading sellers express the belief that the week has been the dulllest for many months. While there has been a fair volume of inquiry for foundry grades, running from small lots to upward of 1000 tons for prompt and the remainder of the year delivery, a good share is thought to have been largely for the purpose of testing the market, and in a number of instances, while fair sized lots are asked for, actual purchases represented but a small percentage of the original inquiry. Prices are unchanged but firmer, producers are unwilling to make further concessions, and \$16, delivered, for standard brands of eastern Pennsylvania No. 2 X foundry iron represents the inside price. A differential of 25c. a ton is made on No. 2 plain. Sales, however, have been small, principally in lots running from carloads to upward of 100 tons, for near future shipment, at \$16 to \$16.25, delivered. Makers contend that these prices represent the bottom, and that as older orders at higher prices, which have enabled them to even up to some extent, have been worked off they would blow out their furnaces rather than take extensive orders at present prices, which taken alone would represent a direct loss. The cast iron pipe foundries in this district are still in the market for a considerable quantity of low grade iron, but as their idea of prices is about 50c. below that for forge iron, and sellers refuse to meet their views, very little business of any importance has been done. Virginia foundry grades are firm at \$13.25 to \$13.50, f.o.b. furnace, for No. 2 X foundry, with some producers making no variation in prices between No. 2 X and No. 2 plain. This represents \$16 to \$16.50, delivered in this territory, for No. 2 X, dependent on the freight rate. Further sales of low grade Virginia foundry iron are reported, one pipe interest in that territory taking, it is understood, about 4000 tons for delivery over the remainder of the year. More interest is to be noticed in the steel making grades; an Eastern melter is in the market for from 3000 to 4000 tons of low phosphorus iron. Small sales of this grade have been made at prices equal to \$22.50 to \$22.75, delivered in this vicinity. There has been some little inquiry for basic iron, but reported sales lack confirmation; this grade can be had for \$15, delivered, Eastern mills. There has been no active demand for forge iron; small sales have been made at \$15, delivered, which represents the market for that grade. The following range of prices represents the market for standard brands, for early delivery in buyers' yards, eastern Pennsylvania and nearby points.

|  |                    |
|--|--------------------|
| Eastern Pennsylvania, No. 2 X foundry..... | \$16.00 to \$16.25 |
| Eastern Pennsylvania, No. 2 plain.....     | 15.75 to 16.00     |
| Virginia, No. 2 X foundry.....             | 16.00 to 16.50     |
| Virginia, No. 2 plain.....                 | 16.00 to 16.25     |
| Gray forge.....                            | 15.00              |
| Basic.....                                 | 15.00 to 15.25     |
| Standard low phosphorus.....               | 22.50 to 22.75     |

**Ferromanganese.**—The market is practically at a standstill. No inquiry is reported from consumers in this territory, although some small business is offered by Western buyers. Prices are entirely nominal, from \$30 to \$40, seaboard, being named for 80 per cent. ferromanganese.

**Billets.**—Consumers show little interest in the market, taking, as a rule, only small lots for early requirements. There has been no inquiry during the week for large lots nor for extended deliveries. Forging billets are a shade more active than rolling billets, and a little business for Western delivery has been booked by makers in this territory. Ordinary open hearth rolling billets are quoted at \$27.50 to \$28, delivered in this territory, although a concession of 50c. a ton can be had for desirable orders. Forging billets are quoted at \$29.50 to \$30, Eastern mill, the usual extras applying for high carbons and special sizes.

**Plates.**—A fair run of specifications is reported, but there has been a slight falling off in the volume of new business, and mills are not holding the average output as well as they did last month. The bulk of the sales have been in miscellaneous lots for prompt delivery, although some fair business in tank and ship plates is under consideration. Prices are somewhat firmer, 1.55c. delivered, representing the minimum for ordinary plates, although 1.60c. is sometimes obtained for small lots.

**Structural Materials.**—Several building propositions, under consideration in this district, are still unclosed. Some little bridge work, one requiring about 700 tons, has been taken and a new bridge proposition, requiring about 1000 tons, has come out. Some further moderate building work is also before the trade. Transactions during the week have mostly been small, with prices a shade firmer at 1.55c., minimum for plain shapes, delivered in this vicinity.

**Sheets.**—No variation in the demand is reported, buying continues of a small lot character, purchasers usually urging deliveries. There has been practically no demand for forward deliveries. For small lot business prices are unchanged, but could doubtless be shaded from \$1 to \$2 a ton

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for desirable orders. Quotations of Eastern manufacturers range as follows for prompt lots: Nos. 18 to 20, 2.70c.; Nos. 22 to 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.

**Bars.**—The demand is quieter and sales are principally in small quantities for early shipment. The recent quotation of 1.42½c. minimum for refined iron bars has been shaded and 1.40c., delivered in this vicinity, can be done. Other sellers, however, hold firmly at higher levels, so that 1.40c. to 1.50c., delivered, represents the full range of the market. Steel bars are moderately active at 1.55c. to 1.60c., delivered.

**Coke.**—Moderate sales of foundry grades for prompt and remainder of the year delivery are reported at unchanged prices. The demand, however, is not active. Furnace coke continues dull, very few sales of standard coke being made, although a sale of a moderate tonnage of second grade at \$150, at ovens, is reported. Standard furnace coke is firm at \$1.65 to \$1.75, ovens. The following range of prices per net ton about represents the market for delivery in buyers' yards in this vicinity:

|                                 |                  |
|---------------------------------|------------------|
| Connellsville furnace coke..... | \$4.00 to \$4.15 |
| Foundry coke.....               | 4.50 to 4.75     |
| Mountain furnace coke.....      | 3.80 to 3.75     |
| Foundry coke.....               | 4.10 to 4.35     |

**Old Material.**—While the market generally is dull, a shade more interest is shown in certain grades. Some mills are taking deliveries on old orders for heavy melting steel, placed at higher prices, but insist on the material being strictly up to grade; but dealers find it difficult to meet specifications at ruling prices. Further sales of old car wheels are reported, large lots selling down to \$13.75, delivered. Buyers do not show a great deal of interest in the market, but in a number of cases take on small lots at bargain prices. Owing to the lack of transactions, quotations are practically unchanged. The following range, however, about represents the market for delivery in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia of 45c. to \$1.35 per gross ton:

|                                  |                    |
|----------------------------------|--------------------|
| No. 1 steel scrap and crops..... | \$13.75 to \$14.00 |
| Old steel rails, rerolling.....  | 15.50 to 16.00     |
| Low phosphorus.....              | 19.00 to 19.50     |
| Old steel axles.....             | 20.00 to 20.50*    |
| Old iron axles.....              | 26.50 to 27.50*    |
| Old iron rails.....              | 18.00 to 18.50     |
| Old car wheels.....              | 13.75 to 14.25     |
| No. 1 railroad wrought.....      | 15.00 to 15.50     |
| Wrought iron pipe.....           | 13.50 to 14.00     |
| No. 1 forge fire.....            | 12.00 to 12.50     |
| No. 2 light iron.....            | 7.50 to 8.00       |
| Wrought turnings.....            | 8.75 to 9.25       |
| Cast borings.....                | 9.25 to 9.75       |
| Machinery cast.....              | 14.00 to 14.50     |
| Railroad malleable.....          | 13.50 to 14.00     |
| Grate bars.....                  | 11.50 to 12.00     |
| Stove plate.....                 | 10.00 to 10.50     |

\* Nominal.

The No. 2 Furnace of the Warwick Iron & Steel Company, Pottstown, Pa., was banked for about a week, for repairs to the lining.

### Buffalo

BUFFALO, N. Y., August 23, 1910.

**Pig Iron.**—The amount of new business taken during the week has been phenomenally small. Few furnaces are competing for business at the present unremunerative prices and the business offering is principally for carload lots, piecing out stock to cover temporary requirements. The only orders for larger tonnage reported was one for 1000 tons No. 2 foundry from a Connecticut company and one for 600 tons foundry irons for September and October delivery. One inquiry still under negotiation is for 1000 tons No. 2 foundry from the upper Hudson district. The demand for malleable and basic was very limited. Shipments continue to go forward in good volume on contracts, especially such as permit of Erie Canal routing. Prices are practically stationary, but are a little more firmly maintained by the principal interests. We quote as follows, f.o.b. Buffalo, for delivery during remainder of the year:

|                      |                    |
|----------------------|--------------------|
| No. 1 X foundry..... | \$15.00 to \$15.50 |
| No. 2 X foundry..... | 14.50 to 15.00     |
| No. 2 plain.....     | 14.25 to 14.75     |
| No. 3 foundry.....   | 14.00 to 14.50     |
| Gray forge.....      | 14.00 to 14.25     |
| Malleable.....       | 14.75 to 15.25     |
| Basic.....           | 15.25 to 15.75     |
| Charcoal.....        | 18.75 to 19.25     |

**Finished Iron and Steel.**—The general situation is a little brighter with increased inquiry in most lines of finished products and all indications pointing to a good fall business. The demand for steel bars is well maintained, with 1.40c., Pittsburgh, the absolute minimum for large orders, and 1.45c. for small lots. An export order for Canada was received during the week for 1000 tons steel bars for cold drawn purposes. An inquiry is also in the market for 1000

tons Bessemer billets for Canadian export. Plates and shapes are in good demand, with many inquiries for immediate shipment for small jobs of structural work, 1.40c., Pittsburgh, being bottom for desirable orders; 1.45c. quoted on the general run of business, and 1.50c. for small miscellaneous orders. In fabricated material inquiry has improved somewhat, but prices still have a tendency toward softness. Bids are soon to be taken for the steel for two large freight houses to be erected by the New York Central Railroad at Utica, N. Y., requiring about 300 tons. Figures are also to go in next week for steel for the Buffalo Tuberculosis Hospital buildings at Perrysburg, N. Y., taking about the same quantity; bids are soon to be received for steel for the addition to the plant of the Hammersmith Paper Company, Erie, Pa., 400 tons, and for steel for the Y.M.C.A. building at the same place, 100 tons. The specifications for the St. Vincent's Hospital at Erie are to be revised and refigured. Tentative plans are being made for a new passenger station for the Lackawanna Railroad at Buffalo, which with the necessary track elevation will call for a large tonnage of steel. The Buffalo Structural Steel Company has closed contract for the fabrication and erection of the steel for the State Normal School at Oswego, 600 tons, and the Lackawanna Bridge Company, Buffalo, has taken 300 tons of bridge work for the Chestnut Ridge branch of the Central Railroad of New Jersey.

**Old Material.**—The market has taken on a slightly more favorable aspect, with a little more inquiry, than has been observable for a number of weeks past, especially for wrought scrap and iron axles. The taking of material on contract by the mills, while still dragging, shows a slight improvement. Prices remain practically unchanged. We quote as follows, per gross ton, f.o.b. Buffalo:

|  |                    |
|--|--------------------|
| Heavy melting steel.....                     | \$12.75 to \$13.25 |
| Low phosphorus steel.....                    | 17.00 to 17.50     |
| No. 1 railroad wrought.....                  | 14.00 to 14.50     |
| No. 1 railroad and machinery cast scrap..... | 13.25 to 13.50     |
| Old steel axles.....                         | 17.50 to 18.00     |
| Old iron axles.....                          | 22.00 to 22.25     |
| Old car wheels.....                          | 13.50 to 14.00     |
| Railroad malleable.....                      | 13.00 to 13.50     |
| Boiler plate.....                            | 10.75 to 11.25     |
| Locomotive grate bars.....                   | 10.50 to 11.00     |
| Pipe.....                                    | 10.50 to 11.00     |
| Wrought iron and soft steel turnings.....    | 6.50 to 7.00       |
| Clean cast borings.....                      | 5.50 to 6.00       |
| No. 1 bushing scrap.....                     | 11.75 to 12.00     |

A 15-mile freight belt line is to be built at Rochester, N. Y., extending from the Rush Reservoir to the State Industrial School.

### Cincinnati

CINCINNATI, OHIO, August 24, 1910.—(By Telegraph.)

**Pig Iron.**—The situation appears to be clearing somewhat and most of the inquiries now coming in appear to be the forerunners of business and not merely being sent out to size up the market. Local interests are quoting on 3000 tons of gray forge iron, and there are quite a number of requests for prices on the regular foundry grades and some for the high silvery irons. The furnaces are yet very slow in soliciting for next year's delivery, and it will probably be well along in September before they get down to work and make up definite figures that will be attractive to buyers. The general day to day business is holding up fairly well, but orders booked mainly call for small tonnages. A central Ohio firm is reported to have purchased 1000 tons of No. 2 Northern foundry iron and also 500 tons each of Southern Nos. 2, 3 and 4. This was all for spot cash and prompt shipment, and it is stated concession was made in present market prices. Quoted prices remain the same, with \$11.50 for Southern foundry No. 2, Birmingham, and around \$11 for some of the Tennessee brands; Northern irons are quoted at \$14.50 to \$15, Iron-ton, all for shipment during the remainder of the year. There is a well founded rumor that further curtailment in production is contemplated in the near future for the Hanging Rock district. For immediate delivery and for the remainder of the year, based on freight rates of \$3.25 from Birmingham and \$1.20 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

|  |                    |
|--|--------------------|
| Southern coke, No. 1 foundry.....      | \$14.75 to \$15.25 |
| Southern coke, No. 2 foundry.....      | 14.25 to 14.75     |
| Southern coke, No. 3 foundry.....      | 13.75 to 14.25     |
| Southern coke, No. 4 foundry.....      | 13.50 to 14.00     |
| Southern coke, No. 1 soft.....         | 14.75 to 15.25     |
| Southern coke, No. 2 soft.....         | 14.25 to 14.75     |
| Southern gray forge.....               | 13.50 to 14.00     |
| Ohio silvery, 8 per cent. silicon..... | 16.20 to 16.70     |
| Lake Superior coke, No. 1.....         | 15.70 to 16.20     |
| Lake Superior coke, No. 2.....         | 15.20 to 15.70     |
| Lake Superior coke, No. 3.....         | 15.20 to 15.70     |
| Standard Southern car wheel.....       | 25.25 to 25.75     |
| Lake Superior car wheel.....           | 22.25 to 22.75     |

(By Mail.)

**Coke.**—In the Wise County district there has been an accumulation of furnace coke stocks, and for prompt ship-



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ment the price has eased off a little. It is reported that some operations have been taken on spot business as low as \$1.50. The contract price, however, is \$1.70 and higher, individual conditions governing advances. New orders on foundry coke generally call for carload quantities, as most of the larger contracts have been placed. Connellsville and Pocahontas are quoted at \$1.70 to \$1.90 per net ton at oven. Foundry coke is being sold around the same figure in the Connellsville, Pocahontas and Wise County districts, and \$2.10 to \$2.15 would be the average quotable price, with some interests going as low as \$2.

**Finished Iron and Steel.**—No change is to be noted either in prices or existing conditions. In spite of the fact that general business is reasonably good, there is very little doing in the finished material line. Structural material from warehouse is quoted at 1.90c. to 2c. and steel bars at 1.80c.

**Old Material.**—It is stated that railroad offerings just now are lighter than for any previous period. On account of large stocks on hand buyers are very indifferent about doing business. Prices for delivery in buyers' yards, Cincinnati and southern Ohio, are as follows:

|   |                    |
|---|--------------------|
| No. 1 railroad wrought, net ton.....          | \$12.50 to \$13.00 |
| Cast borings, net ton.....                    | 4.50 to 5.00       |
| Steel turnings, net ton.....                  | 6.00 to 7.00       |
| No. 1 cast scrap, net ton.....                | 11.50 to 12.50     |
| Burnt scrap, net ton.....                     | 8.00 to 9.00       |
| Old iron axles, net ton.....                  | 17.50 to 18.50     |
| Old steel rails, gross ton.....               | 14.50 to 15.00     |
| Relaying rails, 50 lb. and up, gross ton..... | 22.50 to 23.50     |
| Old car wheels, gross ton.....                | 12.00 to 13.00     |
| Heavy melting steel scrap, gross ton.....     | 12.00 to 12.50     |

Hickman, Williams & Co., pig iron and coke merchants, Cincinnati, Ohio, are distributing as a souvenir a highly finished brass desk clip, for holding correspondence or memoranda.

### Cleveland

CLEVELAND, OHIO, August 23, 1910.

**Iron Ore.**—Some of the Lake Superior ore that has been offered for resale recently has been withdrawn from the market. Reports indicate that the owners have been unable to dispose of it. Shipments are gradually falling off, and more boats are being laid up because there are not cargoes enough to go around. With the exception of an occasional inquiry for a small lot for a mixture, the market is lifeless. We quote prices as follows: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.20; Mesaba Non-Bessemer, \$4.

**Pig Iron.**—The market in this immediate territory continues very dull. No sales of any size are reported. Local selling agencies report the receipt of some inquiries from surrounding territories for fair sized tonnages of foundry iron for delivery through the remainder of the year and the first quarter. One northern Ohio furnace that was expected to blow out September 1 will probably remain in blast a few weeks longer. Another is scheduled to go out shortly. There is no change in the price situation. No. 2 foundry is being offered at \$14, Valley furnace, but some producers are refusing to quote lower than \$14.25. The foundry melt appears to remain about the same as during the past few weeks. For prompt shipment and the remainder of the year we quote, delivered Cleveland, as follows:

|  |                  |
|--|------------------|
| Bessemer .....                               | \$16.15          |
| Northern foundry, No. 1.....                 | \$15.25 to 15.50 |
| Northern foundry, No. 2.....                 | 14.50 to 14.75   |
| Northern foundry, No. 3.....                 | 14.00 to 14.50   |
| Gray forge.....                              | 14.15 to 14.25   |
| Southern foundry, No. 2.....                 | 15.35 to 15.85   |
| Jackson Co. silvery, 8 per cent, silcon..... | 19.25 to 19.50   |

**Coke.**—The market is very quiet. There is practically no inquiry for foundry grades, consumers now being pretty generally covered by contracts. One local interest during the week closed a contract for its furnace coke requirements for September. We quote standard Connellsville furnace coke at \$1.55 to \$1.70 per net ton, at oven, for spot shipment, and \$1.75 to \$1.85 on contract. Connellsville 72-hour foundry coke is held at \$2.15 to \$2.25 per net ton, at oven, for prompt shipment, and \$2.25 to \$2.50 for the last half.

**Finished Iron and Steel.**—The demand in finished lines continues rather light. Consumers as a rule are buying in only small lots for immediate needs, so that orders are nearly all for small tonnages. Prices are very firm at 1.40c., Pittsburgh, on steel bars, and a local inquiry for 1000 tons with immediate specifications failed to bring out a lower quotation. Less than car lots are not quoted at under 1.45c. Structural material is being firmly held at 1.40c., Pittsburgh, and that is the minimum quotation on plates, with the exception of one or two mills that make only the narrower sizes. Some plate and shape contracts have been placed for the remainder of the year at the 1.40c. price, but

the mills generally are refusing to quote that price except for immediate specifications. The demand for small lots of structural material continues fairly good and some work that has been pending for some time has been placed. The contract for the new plant to be erected by the Seneca Chain Company, Kent, Ohio, requiring about 700 tons, has been awarded to the Mt. Vernon Bridge Company, Mt. Vernon, Ohio, and the contract for the structural steel work for a foundry addition to the plant of the Chandler & Price Company, Cleveland, requiring 500 tons, has been taken by the Riverside Bridge Company, Martins Ferry, Ohio. Although the plans for the 20-story building to be erected for the Dime Savings Bank in Detroit provide for Bethlehem sections, bidders are now asked to submit proposals for standard sections. About 3000 tons will be required. It is expected that proposals will be asked for shortly for the new plant of the Cleveland Electric Illuminating Company, that will require about 2500 tons. The demand for iron bars continues light and prices are weak. We quote iron bars at 1.35c. to 1.40c., at mill. The demand for sheets is inactive and lower prices are being made on galvanized. We quote No. 28 sheets at 2.20c. for black and 3.20c. to 3.25c. for galvanized. Blue annealed sheets, which until recently have remained firm at 1.75c. for No. 10, are easier and are now quoted at 1.70c., but this price can probably be shaded. Prices on steel rivets have been reduced to 1.90c., base, for structural and 2c. for boiler rivets. The market is not firm and the new quotations can probably be shaded.

**Old Material.**—The market continues very dull with no prospect of any change for the better in the near future. The only demand is for small odd lots, which mills are usually able to pick up at prices lower than the ruling quotations. Heavy melting steel and borings and turnings are weaker, but other quotations remain about stationary. The Nickel Plate Railroad closed August 20 on about its usual list. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

|                                      |                    |
|--------------------------------------|--------------------|
| Old steel rails.....                 | \$14.00 to \$14.50 |
| Old iron rails.....                  | 16.00 to 16.50     |
| Steel car axles.....                 | 20.00 to 20.50     |
| Heavy melting steel.....             | 13.00 to 13.25     |
| Old car wheels.....                  | 14.00 to 14.50     |
| Relaying rails, 50 lb. and over..... | 22.50 to 23.50     |
| Agricultural malleable.....          | 12.00 to 12.50     |
| Railroad malleable.....              | 13.00 to 13.50     |
| Light bundled sheet scrap.....       | 9.00 to 9.50       |

The following prices are per net ton, f.o.b. Cleveland:

|  |                    |
|--|--------------------|
| Iron car axles.....                        | \$21.00 to \$21.50 |
| Cast borings.....                          | 5.00 to 5.50       |
| Iron and steel turnings and drillings..... | 6.50 to 7.00       |
| Steel axle turnings.....                   | 9.00 to 9.50       |
| No. 1 bushelling.....                      | 11.00 to 11.50     |
| No. 1 railroad wrought.....                | 13.00 to 13.50     |
| No. 1 cast.....                            | 11.50 to 12.00     |
| Stove plate.....                           | 10.50 to 11.00     |
| Bundled tin scrap.....                     | 11.00 to 11.50     |

### St. Louis

ST. LOUIS, August 22, 1910.

The sentiment among pig iron buyers is much better, due to good crop reports and the curtailment of production in the South. No marked improvement in the demand is looked for in the next few weeks, owing partly to the bulk of the inquiries being for 1911 iron. The volume of business in coke is of small proportions, the large consumers having covered their requirements. An excess in receipts and shipments at St. Louis of nearly a million tons during the first six months of 1910 over those of any previous half year in the history of the city is shown by the statistics of the Merchants' Exchange. The total inbound and outbound freight handled by the railroads was 24,344,088 tons. Building in the city continues active, with a heavy demand from the Southwest for building material. Money, though in fair supply, is firm. Bank clearings in St. Louis, Kansas City and St. Joseph continue large and in excess of the same week in 1909.

**Coke.**—A canvass of the various sales agencies and merchant sellers disclosed that a limited business was doing in coke during the past week, particularly with the first mentioned offices, such demand as is passing being mainly of a jobbing character. Inquiries, too, were in small volume. Shipments on contract are active, however, and there were no requests for delayed delivery reported. The only large inquiry mentioned was one from a local foundry for 1000 tons, delivery over six months. During the past 30 days one merchant seller bought upward of 20,000 tons of foundry coke, and another merchant seller purchased 10,000 tons, all of which but 2000 tons has been sold, and of the sales one was 2000 tons which had not previously been reported. One office reports sale of 50 cars of Indianapolis by-product coke, shipment over a year. The tone of the market continues firm. Standard 72-hour Connellsville foundry is quoted at \$2.25 per net ton, at oven, for spot to \$2.35 to \$2.50 for shipment over a year. Virginia is offered at \$2.25

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to \$2.50 for contract, f.o.b. oven. Car lot orders are 25c. per ton higher.

**Pig Iron.**—The unsettled feeling in pig iron continues, and the trade does not manifest much disposition to take on iron freely at the market price. It is still distinctly a buyers' market in that some furnaces do not make a firm stand to maintain the figures asked by the leading producers. A feature of the situation is the fact that an increasing disposition is becoming observable on the part of large consumers to contract for iron for the first quarter of 1911, and there is a corresponding lack of interest in the purchase of iron for delivery over the remainder of the year. In the report of inquiries received by the leading sales agencies mentioned below, it is noteworthy that more than 50 per cent. of them are for the first quarter of 1911. One office reports inquiries, mostly for No. 2 Southern foundry, aggregating 3000 to 4000 tons, with sales of 500 to 600 tons. Another broker reports various inquiries totaling 3500 tons with sales of 500 tons, mostly Southern foundry, while one of the largest commission houses sold but 200 tons. A merchant seller reports sales of 500 tons. Irregularity in price also continues to be a feature, quotations ranging from \$11 to \$11.50, Birmingham, covering shipment over the remainder of the year, but the higher figure is pretty firmly maintained for low phosphorus iron. Iron for shipment over the first half of 1911 is offered by two offices at \$11.50, while No. 2 Southern foundry of standard quality can be bought for August and September delivery at \$11, f.o.b. cars, Birmingham. Southern Ohio is quoted at \$15, f.o.b. furnace, but some offers of 50c. less are understood to have been accepted.

**Finished Iron and Steel.**—The leading interest reports a quiet demand for standard rails, neither the steam nor electric railroads being in the market to any extent. Shipments on prior contracts are coming forward. For light rails there is a fair inquiry from coal interests. The local demand for structural material is small, and not much new business is being received from the Southwest, such inquiry as there is being for specific work. Bars are not in as good demand, the most inquiry being for steel. Consumers of bars are ordering out freely, however, on contracts. There is only a limited business doing in track material, but large deliveries are being made on prior sales.

**Old Material.**—The leading dealers in scrap iron and steel state that, while the market is still dull and prices are easier on some lines, there is, in their opinion, a better feeling with large consumers, and indications are seen of a more active market obtaining in the near future. In steel scrap there is an undercurrent of strength, owing to prospective buying by rolling mill interests. There were no railroad offerings on the market last week. While still a dealers' market, prices are somewhat less of a nominal character than has been the case during the past 30 days. We quote dealers' prices as follows, per ton, f.o.b. St. Louis:

|   |                    |
|---|--------------------|
| Old iron rails.....   | \$14.50 to \$15.00 |
| Old steel rails, rerolling.....                               | 14.00 to 14.50     |
| Old steel rails, less than 3 ft.....                          | 13.00 to 13.50     |
| Relaying rails, standard sections, subject to inspection..... | 23.50 to 24.00     |
| Old car wheels.....   | 15.00 to 15.50     |
| Heavy melting steel scrap.....                                | 12.50 to 13.00     |
| Frogs, switches and guards, cut apart.....                    | 12.50 to 13.00     |

The following quotations are per net ton:

|   |                    |
|---|--------------------|
| Iron fish plates.....                       | \$14.00 to \$14.50 |
| Iron car axles.....                         | 19.00 to 19.50     |
| Steel car axles.....                        | 19.00 to 19.50     |
| No. 1 railroad wrought.....                 | 12.75 to 13.25     |
| No. 2 railroad wrought.....                 | 11.75 to 12.25     |
| Railway springs.....                        | 11.50 to 12.00     |
| Locomotive tires, smooth.....               | 16.50 to 17.00     |
| No. 1 dealers' forge.....                   | 11.00 to 11.50     |
| Mixed borings.....                          | 5.00 to 5.50       |
| No. 1 busheling.....                        | 10.50 to 11.00     |
| No. 1 boilers, cut to sheets and rings..... | 9.50 to 10.00      |
| No. 1 cast scrap.....                       | 10.50 to 11.00     |
| Stove plate and light cast scrap.....       | 9.00 to 9.50       |
| Railroad malleable.....                     | 9.00 to 9.50       |
| Agricultural malleable.....                 | 8.50 to 9.00       |
| Pipes and flues.....                        | 9.50 to 10.00      |
| Railroad sheet and tank scrap.....          | 8.50 to 9.00       |
| Railroad grate bars.....                    | 8.50 to 9.00       |
| Machine shop turnings.....                  | 8.00 to 8.50       |

The E. C. Smith Pig Iron & Coke Company, St. Louis, has been incorporated; capital stock, fully paid, \$10,000; incorporators—W. W. Henderson, E. C. Smith and H. J. Marks. The offices of the company are in the Pierce Building.

The Puxico Iron Company, Puxico, Mo., has purchased the iron mines of the Big Muddy Coal & Iron Company in the Arcadia Valley and the mountains surrounding it. Between 25,000 and 26,000 acres are included in the transfer. William Chauvenit of St. Louis is reported to have been engaged to superintend the commencement of the work. More than 500,000 tons of ore lie on the dump of the old mines.

It is estimated that this city is now doing a business of upward of \$12,000,000 a year in electrical supplies, which is

a remarkable development for a comparatively new industry.

The Terminal Railway Association is now reconstructing the Merchants' Bridge approaches with steel and concrete, and is constructing new yards and team tracks at Tyler street. This addition will have a capacity of 400 cars daily.

### The German Iron Market

BERLIN, August 12, 1910.

The situation in respect to organizing the pig iron trade has undergone a great change since last week's report. It looked then as if the new selling agency would be of only secondary importance, but within the past five days the negotiations have made such progress that the great organization of the trade may now be looked upon as practically completed. The independent furnaces at Emden and Bremen—the latter of which begins operations before the end of the year—have decided to join the movement, and to-day it was announced that the Siegerland group, with the exception of three companies, have also at last yielded to the inevitable. It is not yet stated whether an arrangement has been effected with the Luxemburg-Lorraine furnaces, but it is assumed that they will prove ready and willing to cast in their lot with the new organization. The furnaces there already have an organization of their own, and this will facilitate the making of an arrangement with them, if one has not already been made. Moreover, they are in part owned by the great companies of the Rhenish-Westphalian district, which are among the leaders in carrying through the new organization, and they are in part in the hands of families long identified with the iron trade—all circumstances favoring the conviction that these furnaces will be in the general organization. The three Siegerland furnaces that are keeping aloof are the Geisweiler Eisenwerk, Charlottenhütte and Bremerhütte, about the most important furnaces there, but it is believed that the organization can get on without them. The decision of the other furnaces of that region to join was apparently adopted under practical compulsion, and a feeling of considerable embitterment is reported as existing among them.

While the new organization was intended to be only a selling agency at the time when it was formed, about a fortnight ago, it seems now to be regarded as practically certain that it will take the form of a syndicate, which means in German usage a considerably more compact and efficient organization than a mere association with a common selling agency. As to the amount of the pig iron product of the country to be covered by its operations, this will be relatively small in view of the fact that the great mixed producers smelt chiefly for their own consumption, and this iron is not included in their allotments. Thus the allotments in the new syndicate will hardly exceed 2,000,000 tons, whereas the make of pig in Germany this year will exceed 13,000,000 tons. It is feared that even so the allotments will be too heavy for the demands of the open market. The new organization has not yet given out a complete list of the allotments, and the price schedule will not be arranged for another week or two. It is believed that it will adopt a higher scale than the prices now ruling, but it will evidently attempt no considerable advance, since English furnaces would at once take advantage of such a change to ship large quantities of iron into Germany. It is noted with some concern that a Glasgow house has just established a selling agency at Duisburg on the Rhine, evidently with the intention of taking advantage of the new situation here.

### Increased Demand for Pig Iron

The prospect that the syndicate would soon be a fixed fact has called forth a marked increase in the demand for pig iron. Some of the market reports state that the furnaces have been literally flooded with inquiries for iron for 1911 delivery. On the lower Rhine and in the Siegen region, however, producers are refusing to take orders so far ahead, in view of the uncertainties of the price situation. In the Luxemburg district, on the other hand, there has been considerable selling for 1911; one great company is mentioned which sold so heavily that it has now suspended further selling in order not to be oversold. The open market for pig remains weak despite this increased demand. On the Düsseldorf Exchange a week ago most grades of German iron were about 1 mark cheaper, and English iron was also lower. Heavy plates were partly lower also, but boiler plates and thinner qualities were higher, corresponding to the advance made by manufacturers as mentioned in last week's letter. The production of pig keeps up well; it reached 1,228,300 tons in July, as against 1,219,000 tons in June. The imports of foreign ores in July amounted to only 348,600 tons, as compared with 873,400 tons in July, 1909; but the decline is probably due to the extraordinarily heavy movement in June. It is announced that Krupp will erect another furnace at the Rheinhausen establishment, making the ninth furnace operated by that company.

The bar iron trade has grown more active since the



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association was renewed several weeks ago, and prices are also held more firmly by the few outsiders which had been making trouble. The chief of these latter, the Hoesch Company, has signed the new agreement and has stopped its cheap selling, and to-day it is announced that another of the chief independents has joined. In September the association is to meet to adopt the 1911 prices, but it is hardly expected that a change will be made. The wire association will meet next week to take action with regard to sales for the fourth quarter. It is reported that business in this specialty shows signs of improvement.

The shipments of steel rails, structural goods and billet materials by the Steel Syndicate in July amounted to 391,000 tons, against 448,000 tons in June; but July is usually a rather slack month. Germany's exports of steel rails this year show a big gain, whereas the exports from England, as given in the German press, have been considerably reduced.

The stock markets have shown a strong tendency for iron shares for a week or more. The market has been influenced by the prospects for organizing the pig iron trade, but particularly by increased dividends just announced by several companies. Hoesch pays 18 per cent., against 14 per cent.; Deutsch-Luxemburg, 11 per cent., against 10 per cent.; Vereinigte Stahlwerke van der Zypen und Wissener Eisenhütten, 10 per cent., against 7½ per cent., and Dortmunder Union, 3 per cent., against 2 per cent. (on its common stock).

German locomotive shops have just received orders for 50 locomotives from French railroads, and it has been announced this week that the Rumanian Government with order 86, dividing them equally between German and Belgian shops.

The capital of the Deutsch-Luxemburg Company, after the absorption of the Dortmunder Union, as described in last week's report, will be greater than at first supposed. The increase will be \$8,700,000, bringing its total capital up to \$23,800,000. A part of this is for acquiring the stock of a coal company.

### Birmingham

BIRMINGHAM, ALA., August 22, 1910.

**Pig Iron.**—Considerable improvement has been noted in inquiries and, with the tonnage actually sold fairly attractive, the market now has a decidedly stronger tone. No concessions were made by the producing interests as an incentive for the partial reaction, and it is generally conceded that foundry trades have improved and founders' requirements become urgent. Of the sales known to have been made during the past week a lot of 1000 tons for shipment covering the remainder of this year is most significant. This tonnage was sold at \$12, Birmingham, for strictly No. 2 foundry, and without any conditions to make the transaction other than regular. An aggregate of 900 tons for shipment commencing immediately and extending through September is reported sold at \$11.50 for No. 2. A lot of 500 tons of No. 2 foundry also is reported sold at \$11.50, but in this case it is understood that shipments are to cover the remainder of this year. Comparatively small lots of No. 4 foundry and gray forge for spot shipment have recently sold at a basis of \$12 for No. 2, but, on the other hand, lots of 100 tons of No. 3 foundry for comparatively early delivery are available at the \$11.50, Birmingham, basis. High manganese iron has within the week brought \$12.50 for deliveries to cover September and October, and shipments further advanced are quoted with some reluctance. A very encouraging feature just at this time is the fact that in many cases shipments that have been deferred from time to time are being ordered out, and that all resale iron has practically disappeared. Of course there is considerable tonnage still in warrant yards, but there is no apparent eagerness to dispose of such holdings, and no interference in market conditions is anticipated from that direction while prices remain as at present. There has been an addition to the output by the blowing in of one furnace in the past week. However, in some cases furnace yards are practically depleted of stocks, and it is understood on good authority that one furnace will be blown out for relining in the next 30 days and that a further reduction in the output will be made for other reasons.

**Cast Iron Pipe.**—The general condition of this market has improved, in line with the improvement noted in other markets, but no specific information as to lettings other than have been previously mentioned is available. All local plants continue to operate to capacity, and in some cases certain sizes are being stocked in anticipation of contracts reasonably expected to materialize in a short time. The business actually placed in the past week is of fair volume and prices are about last published. Cast iron soil pipe plants are more active, and that material is being moved satisfactorily. We quote water pipe as follows, per net ton, f.o.b. here: 4 to 6 in., \$22.50; 8 to 12 in., \$21.50; over 12 in., average, \$20.50, with \$1 per ton extra for gas pipe.

**Old Material.**—The announcement of a resumption of operations at the plant of the Southern Iron & Steel Company on or about September 15 is the most encouraging feature in this market. The aggregate of consumption by local plants is at this time greater than for some time past, and for certain grades much better prices are being received. A revision in quotations has recently been made by dealers, but in the main quotations are nominal, and prices actually obtainable depend largely upon the nature of the inquiry. We quote revised asking prices as follows, per gross ton, f.o.b. cars here:

|                                |                    |
|--------------------------------|--------------------|
| Old iron axles.....            | \$15.50 to \$16.00 |
| Old iron rails.....            | 13.50 to 14.00     |
| Old steel axles.....           | 15.00 to 15.50     |
| No. 1 railroad wrought.....    | 13.50 to 14.00     |
| No. 2 railroad wrought.....    | 9.50 to 10.00      |
| No. 1 country wrought.....     | 8.50 to 9.00       |
| No. 2 country wrought.....     | 8.00 to 8.50       |
| No. 1 machinery.....           | 10.00 to 10.50     |
| No. 1 steel.....               | 12.00 to 12.50     |
| Tram car wheels.....           | 10.00 to 10.50     |
| Standard car wheels.....       | 11.00 to 11.50     |
| Light gas and stove plate..... | 8.50 to 9.00       |

### New York

NEW YORK, August 24, 1910.

**Pig Iron.**—The week has been decidedly quiet, transactions having been limited to small quantities. Inquiries have not been of a character to indicate any early buying of moment. A malleable manufacturer is inquiring for 1500 tons of malleable Bessemer, and some low phosphorus is under consideration, but the inquiries from the general foundry trade are few and small. As far as can be ascertained, no pig iron has been bought in this market by the cast iron pipe interests, although it is reported that purchases have been made in other sections. Some interruption to the movement Eastward of pig iron from Buffalo has occurred through the difficulty in securing freight room on Erie Canal boats because of the heavy grain movement, which is more attractive business to the boatmen. Prices are a shade lower, but not notably different from those given last week. Northern foundry iron at tidewater is, therefore, continued as follows: No. 1, \$16 to \$16.25; No. 2 X, \$15.50 to \$16; No. 2 plain, \$15.25 to \$15.50. On Southern iron quotations are \$15.75 to \$16 for No. 1 and \$15.25 to \$15.75 for No. 2.

**Steel Rails.**—Rail orders continue light, the only transactions of any size reported for the week being 2200 tons of Bessemer and 650 tons of open hearth rails, taken by the leading interest. The pressure for deliveries on contracts is very strong.

**Finished Iron and Steel.**—In all lines the new business taken continues to be very light, but to some there is evident a slight increase in the volume of inquiries. It is believed now by many that the tide has turned, judged more by sentiment than by actual results so far in the shape of increased business, and gradual improvement is looked for from now on. Undoubtedly it will be several weeks at least before anything like the activity of last spring is again experienced. With the railroads practically out of the market and speculative building no longer in evidence the structural material interests are especially dull. Competition appears to be a little less keen, however, for such business as offers, indicating that prices have reached the minimum at which work can be taken without a loss under present conditions. Plates show little movement, particularly in the East, and steel bar deliveries are steadily improving. Three to four weeks is named for all but the smaller sizes, deliveries on which vary from 6 to 12 weeks. The bar iron business taken is quite satisfactory for the season in all respects except price. Large contracts and inquiries are scarce, but among the more important for structural work are the following: An apartment house on Ninety-eighth street, New York City, 1100 tons, taken by Ravitch Bros.; the Horton ice cream factory, 300 tons, taken by Alfred E. Norton; the Bryon Building, Duane street, 800 tons, taken by Levering & Garrigues, and 500 tons of reinforcing material for the elevated railroad structure of the Brooklyn Rapid Transit Company, taken by the American Bridge Company. For a power house at Montreal to be erected by J. G. White & Co. for the Canadian Power Company, the Structural Iron Company of Montreal will furnish 300 tons of structural material. Very little railroad work is coming out other than the usual small bridge orders that are continually being inquired for. The Central Railroad of New Jersey and the New York, New Haven & Hartford have a few such inquiries out, but practically the only important railroad work pending is that for track elevation work at Chicago for the Pennsylvania Lines West; on 900 tons of this no decision has been reached and 700 tons is still to be bid on. The Boston & Maine has let two bridges, 175 tons, to the New England Structural Company. There is no decision on the Sloan warehouse and nothing new has developed with regard to the New York Subway work, the New York Central terminal work or the Quebec bridge. Prices

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are firm on structural material, plates and steel bars all at 1.56c. to 1.61c. and bar iron at 1.45c. to 1.50c., all New York.

**Ferroalloys.**—Very little interest is being taken in ferromanganese, and those who have it on hand do not show any anxiety to sell at the existing low price. The usual quotation is \$39 to \$39.50, seaboard. There is a good demand for ferrosilicon, and a sale of 100 tons was made in this market during the week at about \$56, seaboard.

**Cast Iron Pipe.**—The Department of Water Supply, Gas and Electricity of the city of New York will open bids to-day on a cast iron pipe laying job in the Borough of Richmond (Staten Island), involving the purchase of 5000 tons of 6 to 24 in. pipe and 200 tons of special castings; also for a straight purchase of 900 tons of water pipe for the Borough of Manhattan. Chambersburg, Pa., will open bids August 30 for 11 miles of pipe, which is to be either 14 or 16 in. A little more interest is manifested by the general trade, so that business shows rather more life. Carload lots of 6 in. are quoted at \$23.50 to \$24, per net ton, tidewater.

**Old Material.**—Dealers are feeling somewhat better, not because business has improved to any extent, but inquiries are coming in somewhat more freely and consumers, therefore, appear to be inclined to take more interest in the market. Holders are not expressing much uneasiness and are not disposed to press sales, believing that every day now brings a buying period closer. In cast scrap a little more business is being done, with a better run of inquiries. Cast borings are not so strong as they have been, as the special demand for this class of material appears to have been satisfied. Rolling mills are almost completely out of the market. Some inquiry has developed for heavy melting steel scrap, but no business of moment is reported. Dealers' quotations per gross ton, New York and vicinity, are as follows:

|   |                    |
|---|--------------------|
| Rerolling rails.....                    | \$12.00 to \$12.50 |
| Old girder and T rails for melting..... | 11.00 to 11.25     |
| Heavy melting steel scrap.....          | 11.00 to 11.25     |
| Relaying rails.....                     | 20.50 to 21.50     |
| Standard hammered iron car axles.....   | 21.50 to 22.00     |
| Old steel car axles.....                | 16.50 to 17.00     |
| No. 1 railroad wrought.....             | 13.00 to 13.50     |
| Wrought iron track scrap.....           | 12.00 to 12.50     |
| No. 1 yard wrought, long.....           | 12.00 to 12.50     |
| No. 1 yard wrought, short.....          | 11.50 to 12.00     |
| Light iron.....                         | 5.00 to 5.50       |
| Cast borings.....                       | 6.50 to 7.00       |
| Wrought turnings.....                   | 7.00 to 7.50       |
| Wrought pipe.....                       | 11.50 to 12.00     |
| Old car wheels.....                     | 12.50 to 13.00     |
| No. 1 heavy cast, broken up.....        | 11.50 to 12.00     |
| Stove plate.....                        | 9.00 to 9.50       |
| Locomotive grate bars.....              | 9.00 to 9.50       |
| Malleable cast.....                     | 12.00 to 12.50     |

### Metal Market

NEW YORK, August 24, 1910.

#### THE WEEK'S PRICES

Cents Per Pound.

| Copper       |              |       | Lead     |           | Spelter  |           |
|--------------|--------------|-------|----------|-----------|----------|-----------|
| August Lake  | Electrolytic | Tin   | New York | St. Louis | New York | St. Louis |
| 18.....13.00 | 12.62½       | 32.75 | 4.40     | 4.30      | 5.25     | 5.10      |
| 19.....13.00 | 12.62½       | 32.85 | 4.40     | 4.30      | 5.30     | 5.15      |
| 20.....13.00 | 12.62½       |       | 4.40     | 4.30      | 5.30     | 5.15      |
| 22.....13.00 | 12.62½       | 34.15 | 4.40     | 4.30      | 5.35     | 5.20      |
| 25.....13.00 | 12.62½       | 34.55 | 4.40     | 4.30      | 5.35     | 5.20      |
| 24.....13.00 | 12.62½       | 34.50 | 4.40     | 4.30      | 5.35     | 5.20      |

The pig tin market is attracting attention. London prices have advanced sharply as the result of a well organized corner there, and the New York market, as stocks are not plentiful, has followed suit. Copper is less active and prices are not so strong. Lead is firm, but in little demand. Spelter has advanced slightly. Antimony is cheaper.

**Copper.**—There is a higher speculative market in copper in London, as it is generally reported that production has been reduced 15 per cent. at least, but this is having a surprisingly small effect on the domestic market, as exports are light and prices here have, if anything, softened. One prominent selling interest is quoting lake copper at 12.87½c., but all other sellers of lake are demanding 13c. As the demand is rather quiet it is probable that a noticeable increase in inquiries would induce the interest in question to advance its quotations to the usually accepted market figure. One prominent dealer in electrolytic copper tried this week to place an order for that grade at a figure under 12.62½c., but was unsuccessful. This would make it appear that the slight weakness shown in the market is in tone only, as there is no pressure to sell at anything less than the prices which prevailed a week ago, which are 13c. for lake and 13.62½c. for electrolytic. The exports of copper so far this month have amounted to 20,041 tons. In the London market to-day spot copper closed at £55 6s. 3d. and futures at £56 2s. 6d. The sales amounted to 500 tons of spot and 600 tons of futures.

**Pig Tin.**—Prices have advanced rapidly in the London market during the last week, as a result of what appears to

be a successful corner operated by prominent interests in that market inclined toward speculation. The New York market has not followed the London market so closely, as in London there was an advance of £3 2s. 6d. within a period of two days, while in this market the advances were more conservative, amounting in all to an increase in price of about 65 points. Stocks of pig tin in this country are pretty well concentrated, and as the consumption just now is especially good it is thought in some quarters that the advance here is warranted. In other words, there are many people who seem to consider the prevailing price a fair quotation for spot tin, when it is taken into consideration that there is just about enough tin on hand for early delivery to take care of current consumption. There has been some good trading this week, and a fair part of the business done was with consumers who were in early need of the metal. The arrivals of tin so far this month have been 4070 tons, and there are 1715 tons afloat. In the New York market this afternoon pig tin sold for 34.50c. The London market closed with spot tin selling at £157 7s. 6d. and futures at £156 2s. 6d. The sales amounted to 150 tons of spot and 290 tons of futures. The market was steady.

**Tin Plates.**—The tin plate market is unchanged. The demand is fair and the prices in New York for 100-lb. coke plates is \$3.84.

**Lead.**—Lead is quiet, but prices are being well maintained. In this market the leading interest seems to have controlled the situation of late, as far as supplying the wants of consumers is concerned, and is keeping its New York quotations relatively lower than at other points. In other words, lead can be had in New York for 4.40c., while in St. Louis, where the price is usually 15 points less than in New York, 4.30c. is asked. This condition exists in other quarters where the leading interest and outside sellers are offering the metal at comparatively higher quotations than prevail in New York. As the matter stands now, outside sellers do not care much about entering into competition with those in control of the New York market, and consequently they are demanding as high as 4.45c.

**Spelter.**—A decided improvement is shown in the spelter market, and it seems apparent that the producers will be successful in their decision to hold their supplies and wait for an improvement in business rather than to sell at a low price. The producers firmly declare that they would have no profit if they accepted anything less than the prevailing quotation for their stock, and claim that at times when the market has been below 5c. at St. Louis the metal has been sold at an actual loss to the producers. They all seem to be of the same opinion on the subject, and while consumers are buying the metal sparingly and only when they are actually obliged to, the market has advanced 15 points within a week and is very firm. The United States Steel Corporation is reported to have bought spelter rather heavily both here and in St. Louis during the last two weeks, and there is an increased demand from other galvanizing interests. Taken altogether, however, it is largely a hand to mouth market, but it is very evident that consumers' stocks are decidedly low. Spelter is now bringing 5.35c. in New York and 5.20c. at St. Louis.

**Antimony.**—Consumers are taking no interest in antimony, and prices have weakened again. Cookson's is being offered at 8.15c. and Hallett's can be had at 7.87½c. Chinese grades are being offered at 7.40c. to 7.50c., and Hungarian antimony can be had as low as 7.25c.

**Old Metals.**—The market is steady, with dealers' selling prices unchanged, as follows:

|                                     | Cents.         |
|-------------------------------------|----------------|
| Copper, heavy cut and crucible..... | 12.25 to 12.50 |
| Copper, heavy and wire.....         | 11.75 to 12.00 |
| Copper, light and bottoms.....      | 11.00 to 11.25 |
| Brass, heavy.....                   | 8.75 to 9.00   |
| Brass, light.....                   | 7.00 to 7.25   |
| Heavy machine composition.....      | 11.25 to 11.50 |
| Clean brass turnings.....           | 8.00 to 8.25   |
| Composition turnings.....           | 9.50 to 9.75   |
| Lead, heavy.....                    | 4.05 to 4.20   |
| Lead, tea.....                      | 3.80 to 3.95   |
| Zinc scrap.....                     | 4.15 to 4.25   |

**Metals, St. Louis, August 22.**—Lead is steady at 4.25c. to 4.30c.; spelter is firmer at 5.15c. to 5.20c., East St. Louis. Zinc ore is higher and quoted at \$39 to \$40 per ton, Joplin, base. Tin is quoted at 34.85c. per pound; antimony, 8.50c.; lake copper, 13.15c.; electrolytic, 13c., all at St. Louis. The demand for finished metals was better last week than for the previous week.

The total imports into the United States during the first full year under the new tariff law—12 months ending August 1, 1910—are shown by Bureau of Statistics figures to aggregate \$1,562,621,181, of which 49.15 per cent. entered free of duty. The importations were larger than in any previous year.



## The Machinery Markets

Business has picked up noticeably in the machinery trade in many sections of the country. Regardless of the recent heavy cancellations on the part of automobile manufacturers and makers of automobile supplies, there is a renewed demand from that source. Some good inquiries are before the trade in the New York market from two large magneto manufacturers, and automobile interests have been generous buyers in the Manhattan territory of late. In New England the automobile industries are sending in occasional orders for tools, and automobile manufacturers in that territory are going ahead with improvements and extensions. Inquiries have increased in the Pittsburgh market and there is a good scattered buying from the outside district. In Chicago the trade is still awaiting action on the part of the railroads in closing out lists recently issued, and there are some good railroad inquiries out in New York. Shops are very busy in Milwaukee, but the work there is mostly on old orders. In the Southwest municipal enterprises are attracting attention, and orders for equipment from city light and power plants are supporting the market. There is a diversified demand for machinery on the north Pacific coast, which is taken as an indication that the general trade there is picking up. Increased business is noticed in San Francisco, where business has suffered recently from labor troubles.

### New York

NEW YORK, August 24, 1910.

Business in the New York market is somewhat intermittent. Houses that were doing very little business three weeks ago are now getting plenty of orders, while other machinery selling firms find that both business and orders have fallen off. The inquiries before the trade just now come chiefly from the general manufacturing field and no one industry seems to be booming. Automobile manufacturers have been good customers in the New York market of late, however. The Fiat Automobile Company has placed some good orders for its new plant at Poughkeepsie, and the Gun Motor Car Company, Utica, N. Y., has completed purchasing a full line of manufacturing equipment for its new plant. Some very good business is promised from automobile supply manufacturers. The Simms Magneto Company, 1780 Broadway, New York, is preparing to build a large plant in the vicinity of New York, and the company now has inquiries out covering a general line of tools and other machinery equipment which indicate that it will be a heavy purchaser before many weeks. The Bosch Magneto Company, 223 West Forty-sixth street, is preparing to build a large plant at Springfield, Mass., and work on the structure will be begun in about 15 days. Machinery men are following the movements of this company very closely, and they have been informed that purchasing against the machine tool list will be begun within the next 30 days. There are some branches of the machinery trade that are inactive, and one of these is that for the manufacture of coal handling and conveying equipment. Manufacturers of steel plant equipment are not getting much in the way of new business just now, but they are still busy in filling orders which were placed around the first of the year, when the steel plants were generous buyers in the machinery market.

Another automobile project that will call for some good expenditures for machine tools is that of the Mercedes Company, which has headquarters in the Times Building. This firm intends to build a two-story brick structure, 100 x 140 ft., at Long Island City, which will be used exclusively for the manufacture of motor trucks. William Lutgens, who is connected with the Mercedes people, has charge of the preparation of the machine tool list.

A fire, covering an entire block, which destroyed several factories, included the plant of W. Ames & Co., 312 Washington street, Jersey City, N. J., August 17, and the company's rolling mill was damaged perhaps beyond repair. Fortunately, the company's new works on Communipaw avenue, for which equipment was recently purchased, will be ready for occupancy within a month. It was intended to move some of the equipment from the old plant, and it is probable that machinery that was damaged will have to be replaced. The plants of Truslow & Fulle, cork manufacturers, the Riegall Sack Company and the Independent Baking Powder Company were totally destroyed in the fire.

A combination of all of the principal companies in Canada manufacturing light woodworking machinery and tools has been effected by the formation of the Canada Machinery Corporation, Ltd., with headquarters at Galt, Ont. The organization assumes control of the plants of the MacGregor,

Gourlay Company, Ltd., Galt, Ont.; John Ballantine & Co., Ltd., Preston, Ont.; the Hespeller Machinery Company, Ltd., Hespeller, Ont., and the woodworking departments of the Goldie & McCulloch Company, Ltd., Galt, Ont., and the Sussex Mfg. Company, Ltd., Sussex, N. B.

The Crocker-Wheeler Company, Ampere, N. J., recently received a large number of orders, among which may be mentioned the following: Two 600-kw. direct current turbo type generators for the Iroquois Iron Company, Chicago, Ill.; these machines will be driven by DeLaval turbines; one 500-kw. synchronous motor generator set for the Tennessee Coal, Iron & Railroad Company, Ensley, Ala.; one 750-kw. direct current generator for the Superior Steel Company, Pittsburgh, Pa.; 3460 hp. in direct current rolling mill motors for the American Sheet & Tin Plate Company, Muncie, Ind.; 235-hp. form W direct current motors for crane service in the Central Furnace plant of the American Steel & Wire Company, Cleveland, Ohio, and one 375-hp. D. C. motor to drive an Ingersoll air compressor in the works of the Bethlehem Steel Company, Bethlehem, Pa.

An addition is to be made to the plant of Tiffany & Co. at Avenue C and Parkhurst street, Newark, N. J., which will consist of two one-story brick buildings to accommodate additional engine and boilers.

Deere & Co., manufacturers of plows, harrows, &c., Moline, Ill., have decided to locate their Canadian branch plant at Welland, Ont., where exceptional railroad and water shipping facilities and cheap Niagara power will be obtained. The site selected is along the east side of the Welland Canal south of the Page-Hersee Tube Works. It is stated that the plant will cost approximately \$1,000,000 and employ 1500 hands.

The United Motors Company, Ltd., a recently organized Canadian company, capital stock \$200,000, will build a plant at Welland, Ont., on a 5-acre site at the southeast corner of the Crossing of the Michigan Central and Grand Trunk railroads. The new company, which is headed by Frederick Sager of Detroit, who has been connected with the E. M. F. Company of that city, expects to have the plant in readiness for the manufacture of motor cars before the end of the year.

The General Chemical Company is building a two-story steel and brick addition to its Buffalo plant at Abbott road and the Buffalo Creek Terminal Railroad.

The Oliver Chilled Plow Works of South Bend, Ind., has commenced construction work upon its Canadian plant at Hamilton, Ont., which will comprise 15 or more buildings, including foundries and machine shops, forge and blacksmith shops, woodworking and paint shops, power house, warehouses and an office building, also a concrete dock 100 x 800 ft. The plans for the plant were prepared by Prack & Perrin, architects and engineers, Berger Building, Pittsburgh, Pa.

The Laidlaw-Dunn-Gordon Company, 115 Broadway, New York, has been awarded contract for furnishing and erecting a 2,000,000 gal. cross compound crank and flywheel Corliss condensing pumping engine for the water works at Perry, N. Y.

The United Construction Company of Albany was low bidder at \$94,700 for constructing the steel bridge over the Oswego River at Bridge street, Oswego, N. Y.

An addition is being made to the blacksmith and machine shop of the Atlas Works of the Standard Oil Company, Elk street and the Buffalo Creek Railroad, Buffalo, N. Y.

The Hamilton Tube Company has purchased the concrete factory building, corner Patterson avenue and Major street, Welland, Ont., and is equipping it for operation.

## THE MACHINERY MARKETS

The Skinner Engine Works, Erie, Pa., is letting contracts for a foundry building, 63 x 100 ft., and a storehouse and shipping building, 20 x 200 ft.

The Village Trustees, Rockville Centre, N. Y., are receiving bids for a 1,000,000-gal. pump to be installed at the pumping station, to be operated either by steam or electricity.

The Nearsteel Company, Jersey City, N. J., has installed a No. 66 Newton patent cupola in connection with the remodeling of the plant which it is occupying.

The William Harris Heating Company has purchased the old plant of the Niagara Falls Heating Company, Niagara Falls, N. Y., and will remodel, enlarge and equip it with new machinery.

### Chicago

CHICAGO, ILL., August 23, 1910.

Midsummer dullness continues in the Chicago machinery market. There are scattering inquiries and occasional sales, but Chicago dealers do not expect much activity in the market until general trade picks up in the fall. Owing to the suspension of purchases by the railroads there is a steady accumulation of pending or prospective railroad business, which will undoubtedly prove a very important factor in the trade some time this fall or early in the winter. Several large lists which have been issued in the past six or eight months are awaiting definite action, and in at least two other cases the data is being compiled by railroad officials for large lists for new shops. A committee of experts from the mechanical department of the Chicago, Burlington & Quincy has been visiting dealers and manufacturers to make selections of tools for the new shops at Havelock, Neb. These shops are now completed and the cranes and other heavy equipment have been purchased. Machinery men who have entertained the Burlington committee have been somewhat surprised that the members of the committee prefer water as a beverage, an incident which is significant of the great change that has taken place in recent years in the personnel of the men who control the purchasing business of railroads.

#### Relocation of the Chicago Machinery Center

Locally the summer has witnessed an important event in the Chicago machinery market. All of the houses that formerly were located in the block on Canal street from Madison street to Washington street have been compelled to move, and most of them have located on Jefferson street, two blocks west. The property on Canal street between Madison and Washington has all been acquired by the Pennsylvania Railroad, excepting one lot and building at the north end of the block, which is involved in a tangle of litigation. The Pennsylvania people are wrecking the buildings on the entire block which they control, but the machinery men have not been able to learn whether the property will be used as a part of a new union depot or whether it will be occupied as an office building or for some other purpose. The block extends directly north from the old union depot and is opposite the new Chicago & Northwestern depot.

Jefferson street by this change will become the center of the machinery market, although several companies have found new locations on South Clinton street. The new building of the Marshall & Huschart Machinery Company, which has been mentioned in this correspondence, is on the west side of Jefferson street just south of Madison. North of Madison street is a new row of machinery houses with enameled brick and glass fronts.

The Cleveland Twist Drill Company's Chicago branch was moved May 1 from 29 North Canal street to a new building at 9 North Jefferson street.

The Norton Company, formerly at 27 North Canal, also moved May 1 to a new building at 11 North Jefferson street.

The Chicago Pulley & Shafting Company, formerly at 21 North Canal street, is now at 32-34 South Clinton street.

The Reeves Pulley Company, formerly at 7 North Canal street, moved about a year ago to 39 South Clinton street.

Fitz Simons & Co. and the Morris & Bailey Steel Company, whose Chicago branches were formerly at 11 North Canal street, are now at 21 South Clinton street.

The Adkins, Young & Allen Company, formerly at 23 North Canal street, has found new quarters a block north at 109 North Canal street.

The Machinists' Supply Company, formerly at 119 and 121 North Canal street, was not forced to move immediately by railroad operations, but as its lease expired next May it was decided that the company would erect a new building of its own at 19-21 North Jefferson street. This building, which is 40 x 150 ft., with three floors and a basement, is now occupied by the company, although the interior instal-

lation is not completed. It is a handsome building with steel shelving on all three floors.

The L. S. Starrett Company, formerly at 427 West Randolph street, has been attracted to the new center, and has located in a new building at 17 North Jefferson street.

The Charles G. Stevens Company, which has been located at 17-19 North Canal street, has been erecting a new six-story building at the corner of Jefferson and Monroe streets, and although the new building is not completed the company is moving its stock in order to vacate its old quarters.

The Union Drawn Steel Company's Chicago branch, 17-19 North Canal street, will have new quarters in the Stevens Building.

The Joseph H. Whitehead Company, machinists' supplies, formerly located at 107 North Canal street, is now occupying quarters at 12-14 North Jefferson street, where it moved during the month of March.

The Steam Power Devices Company, Chicago, has been incorporated with a capital stock of \$6000 to do a general machinery business. The incorporators are Harvey L. Hanson, Leonard W. Novander and Arthur H. Boettcher.

The City Council of Moline, Ill., has directed the fire and water commissioners to advertise for bids for a 6,000,000-gal. pump.

The Hess & Hopkins Company, Rockford, Ill., has increased its capital stock from \$50,000 to \$500,000, and is preparing to enlarge its plant.

The People's Gas Light & Coke Company, Chicago, is receiving bids for the construction of a gas pump plant to be erected at a cost of \$150,000.

The Crown Stove Works, Chicago, whose plant is located at 4631 West Thirtieth street, has been incorporated with a capital stock of \$60,000. The incorporators are John Rogers, Jacob Ringer and Theodore Rabovits.

The Durand Steel Locker Company, whose plant at Waukegan, Ill., was recently destroyed by fire, has purchased the factory buildings of the Monarch Motor Car Company, Chicago Heights, Ill., which it is now equipping for the manufacture of steel lockers. It is understood that most of the equipment required has already been purchased.

The Liquid Carbonic Company, Chicago, will erect at Memphis, Tenn., a large factory building, for which it is now preparing plans.

The Illinois Electric Porcelain Company, Macomb, Ill., incorporated with a capital stock of \$20,000, has purchased a site upon which it will erect a plant for the manufacture of electrical supplies. The officers of the company are: Charles Kettner, president; C. M. Erwin, secretary, and W. C. Sutton, treasurer.

The Pitner Pump Company, Chicago, has been incorporated with capital stock of \$20,000 to manufacture automobile pumps. The company is located at 24 West Michigan street.

E. H. Lundy is seeking a franchise from the city of Eldora, Ill., for a concrete dam across the Iowa River and the erection of a new and modern power plant.

The United Zinc & Chemical Company, Springfield, Ill., is making improvements to its plant which will practically double its capacity. Of the new buildings to be erected the first will be completed by October 1.

The city of Braidwood, Ill., is considering the erection of a new electric light plant and the sale of its old one.

The Hillsboro Electric Light & Power Company, Hillsboro, Ill., has purchased a site for the erection of a new power plant, the work of construction to be started at once.

Lawrence Brothers, Sterling, Ill., have purchased a site for the erection of a factory building, plans for which have not yet been completed. They manufacture hardware specialties.

### Philadelphia

PHILADELPHIA, PA., August 23, 1910.

The market continues quiet in practically all branches. In the majority of instances the volume of business transacted was less than during the previous week. Orders taken both by manufacturers and merchants continue of a single tool character, and little of the business taken has been on strictly fresh inquiry. The Pennsylvania Railroad has placed contracts for a few tools for its Cape Charles, Va., shops and an occasional odd tool, usually small, for some of its other shops, but there is nothing in the atmosphere to indicate any pronounced buying on the part of the railroads in the immediate future. The market generally exhibits the usual characteristics of the month, inquiries of nearly every kind are extremely light and pending business closes slowly owing to the vacation season. While reports of cancellations on old orders, particularly when long delivery on standard



## THE MACHINERY MARKETS

tools was involved is heard of, merchants and builders in this district have not been affected by that condition, although manufacturers of supplies and parts in connection with the building of tools have in a few instances reported that less urgency was shown for deliveries.

There is still an absence of any list of machine tool requirements covering any extended equipment; a few pretty fair propositions are under negotiation, but develop slowly; several prospective lists are in sight, but are not expected to develop into anything tangible for several months. No particular betterment in the demand for second-hand tools and equipment is reported, trade is dull and the demand of a day to day character. The foundry trade generally reports unchanged conditions, the melt, however, is being maintained at a pretty fair average. A scattered demand for boilers, engines and special power equipment is reported, with a very good prospective demand in sight.

The D'Olier Engineering Company has been awarded a contract by the United States engineers for the canal lock gates and operating mechanism for Black Rock Harbor, near Buffalo, N. Y. This will require, in addition to the gate operating mechanism, 10 large structural steel gates. The value of the contract is close to \$146,000.

The Atlas Water Tube Boiler Company, which was recently incorporated under the laws of New Jersey and later purchased the rights of the Atlas Engine Company, Indianapolis, Ind., in its water tube boiler, established executive offices recently in room 217, Franklin Bank Building, Philadelphia. George R. Harvey is general manager and H. A. Scattergood secretary-treasurer of the company.

The Asbestos Fibre Spinning Company, North Wales, Pa., has awarded contracts for an extension to its plant, particulars regarding which are not obtainable.

The Pennsylvania Railroad Company has awarded, it is stated, the contract for the erection of the machine shop, power house and other buildings, to be erected in connection with its proposed improvements at Northumberland, Pa., to W. D. Steinbach & Sons, Lewistown, Pa.

John Melloy's Sons, Broad and Spring Garden streets, have let a contract to Appleton & Burrell, builders, for a five-story manufacturing building, 48 x 96 ft., to be erected at 1434-1436-1438 Brandywine street.

The Mfg. Foundry Company, Sinking Spring, Pa., has resumed operations after a month's idleness, due to an accident to its cupola. A new cupola has been installed, additions have also been made increasing the foundry capacity and assembling department 25 per cent. The plant resumes operations with a good volume of orders on its books.

The Philadelphia & Reading Railway Company has awarded a contract to the American Bridge Company, it is reported, for the widening of the deck plate bridge on the Reading division, below Perkiomen Junction, as well as a plate girder bridge in the same vicinity. This work is authorized in connection with improvements now under way on its line in that vicinity.

Alfred Box & Co. are busy in every department. There has been an active demand for both electric and hand power cranes as well as electric hoists. In connection with the latter class of products a new 42-page catalogue has just been completed, which the manufacturers will furnish on application. Among orders recently booked by the company the following may be mentioned: Edison Electric Illuminating Company, Brooklyn, N. Y., two 20-ton cranes; Pope Mfg. Company, Hartford, Conn., one 10-ton crane; Pennsylvania Railroad Company for its Sunbury and Baltimore shops, two 10-ton cranes; the Ball Engine Company, Erie, Pa., two 5-ton portable electric jib cranes; the Gowanus and Flushing pumping station, Brooklyn, N. Y., one 10-ton crane; Midvale Steel Company, Philadelphia, Pa., three 5-ton and one 10-ton special high speed cranes; Girard Iron Company, Girard, Ohio, one special 10-ton crane; Lobdell Car Wheel Company, Wilmington, Del., one 15-ton four-motor crane, and Wickwire Brothers, Cortland, N. Y., one 5-ton electric crane.

The Scott department of the Reading Iron Company, Reading, Pa., has been very busy. This is the foundry and machine department of the concern, and has been busily engaged on a large amount of work both for the company and outside customers. Work is progressing rapidly on the new puddle mill building by the Reading Iron Company, adjacent to its Keystone Rolling Mill, in connection with which a Roe patent puddling machine will be installed.

### New England

BOSTON, MASS., August 23, 1910.

The automobile industry is still sending in an occasional cancellation of orders for machine tools, but at the present time the movement is not serious. Machinery builders believe that no very serious results are to be expected from this source, but do not anticipate the same volume of business from this trade, though it should not be dull. While expan-

sion will be retarded replacements will be made, and considerable buying will be necessary if a producing balance is to be created in large works that have been purchasing lavishly without sufficient attention to proportions of equipment. The New England automobile builders are going ahead with their plans of extension with no apparent hesitation. Few, if any, cancellations of orders have been made by these concerns.

The ardent hope is held out that good mechanics will drift back from the Middle West to New England. They are needed badly here. The recent depression came at a time when the great automobile works were clamoring for men, offering large inducements in the way of wages, and the skilled workmen of this territory responded in large numbers. The New England cities in which metal manufacturing is a principal industry have grown rapidly in the last decade, as is shown by the census returns now being received. Instead of a shrinkage in labor supply there should be a large growth, and possibly changed conditions in the automobile industry will help a little. An increase in population based almost wholly upon the brass industry, that of Waterbury, Conn., is worthy of special mention, the percentage of growth being close to 60 per cent., a very remarkable figure in the face of the city's location many miles from tidewater.

The rivers of New England are feeling the effects of drought and water power is depleted to such an extent as to have a serious effect upon industry, especially among the textile manufacturers.

William A. Rogers, Ltd., Northampton, Mass., manufacturer of cutlery, will build an addition 40 x 46 ft., two stories and basement, and an existing building, 46 x 76 ft., will be raised one story.

The Atlantic Wire Works, Branford, Conn., manufacturer of iron and steel wire, will erect a new building, 40 x 117 ft., two stories, which will be equipped with new wire machinery.

The business of the National Metal Lath Company, Plainville, Conn., has been incorporated with a Connecticut charter and capital stock of \$10,000. The incorporators are M. H. Treadwell, R. S. Allyn and J. F. Casey, all of New York.

The C. G. Garrigus Machine Company, Bristol, Conn., manufacturer of special machinery and tools, is preparing plans for a new power plant. The new shop has just been completed.

The Andrew B. Hendryx Company, New Haven, Conn., manufacturer of bird cages, picture cord, chain and fishing tackle, has increased its capital stock from \$125,000 to \$150,000, the new securities taking the form of a stock dividend, disposing of a surplus which has been accumulating for a number of years.

The Connecticut Company, which controls extensive street railroad interests in Connecticut, is planning to make a large extension to its power plant at Bridgeport, in which additional generating equipment will be installed.

The American Emery Wheel Company, Providence, R. I., manufacturer of abrasive wheels, is building an addition, 38 x 97 ft., in which five new kilns will be placed, three immediately and the others later on, when the need for still greater manufacturing capacity shall be felt.

Additions to general manufacturing plants include the following: Dartmouth Mill, New Bedford, Mass., large buildings for cloth room, picker room and storehouse; Paul Whitin Mfg. Company, Northbridge, Mass., four-story addition to factory at Rockdale, Mass., to cost \$10,000; Cheney Bros., South Manchester, Conn., silk manufacturers, dressing mill 100 x 425 ft., two and three stories.

### Cincinnati

CINCINNATI, OHIO, August 23, 1910.

It is stated that more heads of firms in this district are absent on vacations now than during any previous time. This naturally causes a slack period in local business. Machine tool builders report a fair number of inquiries, and those who have caught up with orders previously booked are receiving enough to keep them running on average time. The policy of not accumulating large stocks of tools still seems to prevail, and a careful estimate places the stocks on hand now at less than 40 per cent. of those usually carried. Practically this same condition exists with dealers in new machine tools.

Most of the foundries are operating on regular time, and those doing custom work appear to be getting enough day to day business to keep them from becoming discouraged.

The general situation may be summed up as being a waiting one and temporary lulls in buying are not at all disquieting, especially during this particular season. Practically, without exception, every one expects a good fall business.

The Cincinnati Tool Company, whose factory is in the

## THE MACHINERY MARKETS

Norwood suburb, is doing an excellent business in Central and South America, which trade was developed by personal visits of one of its officers. Some recent orders included shop tools for a number of the nitrate mining companies in Chile.

The G. A. Gray Company, Cincinnati, closed its plant for two weeks August 20, for the purpose of making some changes in its power equipment. A new 250-hp. boiler has just been installed that uses natural gas instead of coal as fuel. A 225-hp. cross compound Corliss engine and a larger dynamo will take the place of the company's present equipment. It has just finished work on a 56 x 56 in. x 24 ft. planer, which will be driven by an individual electric motor and two 24 in. x 6 ft. double head planers, belt driven, for the Brown & Sharpe Mfg. Company, Providence, R. I.

An addition, 65 x 115 ft., of steel and concrete construction, is being made to the erecting shop of the King Machine Tool Company, Winton place, Cincinnati.

The Crane & Breed Mfg. Company, Cincinnati, coffin manufacturer, is completing a large four-story factory on West Eighth street, and will soon commence the installation of the necessary manufacturing equipment.

The Baldwin Piano Company, Cincinnati, has had plans prepared for a three-story addition, 80 x 117 ft., to its factory on Gilbert avenue. Contracts have been placed for only a part of the woodworking machinery that will be required.

It is reported that the old Tranter rolling mill in Covington, Ky., has been leased by a firm now incorporating and that it will be placed in operation at an early date. Among the parties said to be interested in the enterprise are James W. Arnold, John F. and Harry Ankenbaur of Cincinnati, and E. C. Kelly, M. Troye and A. L. Brown of Covington, Ky.

The Compressed Wood Preserving Company, Spring Grove avenue and Winton place, Cincinnati, manufacturer of wood paving blocks, is making additions to its plant which will more than double its present capacity.

The Adams & Taylor Machine Company, Fort Wayne, Ind., has purchased a two-story brick building, 45 x 80 ft., on Clay street, and as soon as it can be fitted up will move the plant from its present location at 1318-1322 Erie street.

The Monitor Stove & Range Company, Cincinnati, Ohio, has nearly completed a new 40 x 100 ft. warehouse addition to its plant on the Chicago, Hamilton & Dayton Railroad.

The F. W. Wakefield Brass Company, Vermilion, Ohio, has been incorporated, with capital stock of \$100,000. The company has been doing business at its present location for a number of years and has a fully equipped plant.

The Pioneer Brass Works, Indianapolis, Ind., is erecting an addition to its foundry, 30 x 50 ft., two stories, to be used for core room, metal room and storage purposes. The company is also installing a battery of core ovens.

F. H. Fulton, 1108 South La Fayette street, South Bend, Ind., is taking bids for the construction of a brass foundry addition 50 x 90 ft.

The Hawks Electric Company, Goshen, Ind., has commenced work on the construction of a new steam power plant, which will be equipped with two boilers of 600 hp. and steam turbine of 1000 hp., connected to a 625-kw. generator.

The H. P. Deuscher Company, Hamilton, Ohio, founder and machinist, whose plant was recently destroyed by fire, advises that it has not decided upon plans for rebuilding, but that the matter is now under advisement and that a definite decision will be reached in the course of a few days.

### Detroit

DETROIT, MICH., August 23, 1910.

The past week has brought out less news in relation to industrial expansion than any similar period of the last few months, and in the Detroit market very little buying has been apparent. The principal developments of interest to the machinery trade relate to the extension of hydroelectric projects, electric railroad building and installations of pumping units for municipalities. For shop and foundry equipment the demand has been practically negligible. Proprietors of stone quarries and crushing plants are buying to some extent, but mainly with a view to next season's requirements, and the orders run largely to heavy machinery on which several months' delivery is demanded by the builders. The automobile situation is still uncertain, but seems to be unfolding along the lines mentioned in *The Iron Age's* reports of August 4 and 11. On this point more can be said with confidence in about a fortnight.

A feature of the eighteenth annual convention of the International Railroad Blacksmiths' Association, which has just been held here at the Hotel Cadillac, was a discussion of oxy-acetylene welding, following the reading of two pa-

pers on the subject. The consensus of judgment seemed to be very favorable to the use of this system.

An event which has an important bearing upon future purchases of machinery for hydroelectric developments in this State is the report just made to the State authorities by Prof. M. E. Cooley of the University of Michigan on certain large power companies. Among these are the Grand Rapids-Muskegon Power Company, Grand Rapids, Mich.; Pontiac Power Company, Pontiac, Mich.; Saginaw Power Company, Saginaw, Mich., and Bay City Power Company, Bay City, Mich. In each case the property is valued by Professor Cooley at considerably more than the bond issues for which permission is requested, and there seems to be no further obstacle to the improvement of the several plants.

A factory equipped with woodworking machinery and light metal working tools will be built at Muskegon, Mich., by the Cookerett Company, whose headquarters are now at Grand Rapids, Mich.

The Escanaba Traction Company, Escanaba, Mich., will have complete plans in hand this week for its new concrete dam and power house on the Escanaba River. Some of the details of equipment have already been settled, but others will be decided later.

The Krit Motor Company, Detroit, has increased its capital stock from \$100,000 to \$150,000.

The contract for a new steel bridge to be built at Mt. Pleasant, Mich., has been let to the Joliet Bridge & Iron Company, Joliet, Ill.

The addition to the factory of the Imperial Furniture Company, Grand Rapids, Mich., will be 65 x 168 ft., four stories, of mill construction. Electric power is to be used.

It is announced from Muskegon, Mich., that through the efforts of the local Chamber of Commerce, the Wright Cooler & Hood Company, now of Chicago, will build a large new factory in Muskegon for supplying the automobile trade. In its present location this concern employs 150 men.

The Eureka Machine Company, Lansing, Mich., has been gathering some interesting figures in relation to the economies effected by its mixers and offers very substantial guarantees of service. Despite the lateness of the season, business in this line continues good.

The water works system at Iron River, Mich., will be extended and some new equipment provided. The plans, however, are not yet complete.

The Marshall Furnace Company, Marshall, Mich., which has been offered substantial inducements by other industrial communities, including Jackson, Owosso and Muskegon, to build a larger plant in one of those cities, has announced its decision to remain at Marshall, where a definite policy of expansion will be entered upon. A new site of 10 acres is to be donated by the city for a factory of very considerable capacity.

The city of Sandusky, Mich., will issue bonds to cover the construction and equipment of a municipal power plant for electric lighting and pumping service. Bids on machinery will be taken some time during the coming fall.

The Shaw Electric Crane Company, Muskegon, Mich., has recently taken some heavy orders for large shop cranes, leading railroad companies being among the purchasers.

The Platt Iron Works, Dayton, Ohio, has been awarded contract for a pumping engine of 5,000,000 gal. daily capacity, to be installed in the city water works at Wyandotte, Mich.

The Industrial Works, Bay City, Mich., is increasing its force of patternmakers as a result of orders in hand for heavy work.

The Detroit Gear & Machine Company, Detroit, is putting on more men, particularly in the gear grinding department. Business is reported good for this season of the year.

The Chas. A. Strelinger Company, Detroit, is offering a very compact, easily operated electric set of 4 kw. capacity, driven by a gasoline engine, which can be very advantageously installed in small isolated plants. It can also be made portable by mounting on an ordinary truck.

A branch is about to be established in Detroit for the assembling and delivery of the light three-wheel commercial trucks manufactured by the Wagenhals Commercial Motor Car Company, St. Louis, Mo. A large factory may also be built here in the near future and this city made the headquarters of the company.

Plans are now practically complete for the structural iron plant, 115 x 200 ft., to be built here by H. B. Lewis. The specifications will be in charge of John Scott & Co., Ford Building, Detroit.

Funds will be provided shortly for the proposed improvements to the municipal power, pumping and sewage plants at South Bend, Ind. The enlargement of the water works will be taken up first.

The facilities of the Michigan Alkali Company, whose crushing plant at Alpena, Mich., contains some of the heaviest crushing machinery ever built, will probably need to be further increased before the opening of another season, as the demand for its product is steadily growing.



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The Bevier Gas Engine Company, recently organized at Kalamazoo, Mich., by D. A. Shephardson and others, will be prepared within a few months to enter extensively upon the manufacture of gasoline motors for various purposes.

The Hildreth Mfg. Company, Lansing, Mich., has in contemplation certain plans for enlargement which will call for some new tools, but no authoritative announcement of the details has as yet been made. The gasoline engines manufactured by this company have been readily sold, and there is apparently room for a much larger production.

Plans for the enlargement of the water power plant at Big Rapids, Mich., including the construction of a new flume and the installation of hydraulic turbines of greater capacity than those heretofore in service, are being prepared by Prof. Gardner S. Williams, Ann Arbor, Mich., who is recognized as one of the chief authorities of the Central West on the subject of hydroelectric developments.

It is proposed by the addition of another 12,000,000-gal. pumping engine to increase the capacity of the water works at Grand Rapids, Mich., to 35,000,000 gal. daily, and even this quantity may not suffice, owing to the volume of water now used for factory and other industrial purposes.

The Rapid Motor Vehicle Company, Pontiac, Mich., is installing a complete clam shell bucket coal handling crane system, manufactured by the Northern Engineering Works, Detroit. It has also installed a Northern 10-ton crane in its power station.

The Simplex Fence Machine Company, Battle Creek, Mich., has secured the patents formerly owned by the Battle Creek Wire Fence Company, and is now making preparations for the manufacture of fence machines until recently manufactured by that company.

The Standard Foundry Company, Detroit, Mich., is erecting an addition to its foundry, 51 x 63 ft., two stories.

The Globe Furniture Company, Detroit, Mich., has let a contract for the construction of a three-story factory building, 60 x 288 ft.

The J. E. Scripps Corporation, 65 Shelby street, Detroit, Mich., has plans prepared for a power building, 67 x 138 ft., five stories.

The Luce Furniture Company, Grand Rapids, Mich., has let a general contract for the construction of an addition to its plant, 140 x 530 ft., one story.

The Walker Motor Car Company, 1120 Chamber of Commerce Building, Detroit, Mich., recently incorporated with capital stock of \$150,000, has received propositions from several towns, but has not yet decided upon a location for its factory. In the meantime, however, it is the intention to lease temporary quarters which will be equipped with sufficient machinery for the manufacture of at least 250 cars for the season of 1911. No arrangements have been made for the purchase of the equipment required. Electricity will be used for motive power.

### Pittsburgh

PITTSBURGH, PA., August 23, 1910.

Scattered buying throughout the country is sufficient in volume to bring considerable business to the manufacturers of this district, but the local market has been rather quiet lately and dealers are giving more attention to preparations for fall trade than to the requirements of present business. Inquiries, however, are not lacking, and there is a good deal of estimating to be done, even though the understanding is that purchases will be deferred. Mill engineers and architects have men at work on numerous plans for projected new buildings or additions, and the details of equipment are being outlined, in many instances, considerably in advance of actual construction. Hence, there is a strong undertone to the market, and in spite of some drawbacks the situation is sufficiently promising to encourage expectation of a heavy fall and winter production in most lines of machinery building.

The authorities at Romney, W. Va., will engage an engineering firm to prepare plans for a pumping plant and water works system.

Improvements to be made in the system of the Du Bois Electric & Traction Company, Du Bois, Pa., include an addition to its car house and repair shop at that place.

The authorities at Hudson, Ohio, are in correspondence with manufacturers of this district on the subject of a producer gas plant and electric generator for municipal lighting.

The Westinghouse Electric & Mfg. Company, Pittsburgh, has been awarded contract for all of the electrical machinery to be installed in the new municipal power plant now under construction by Bedford City, Va. The generators will be driven by hydraulic turbines built in the shops of the S. Morgan Smith Company, York, Pa.

Pump builders of this district will figure on machinery

for the new filtration plant at Evansville, Ind., which is expected to be of considerable size.

From Herndon, Va., it is reported that power and crushing machinery will be purchased here shortly by the Belmont Trap Rock Company for a new quarry to be developed near that place, which will probably be electrically operated.

A contract has been placed with the Platt Iron Works, Dayton, Ohio, for two compound, duplex, direct acting pumps of large capacity to be installed in the new city water works plant at Wrightsville, Ga.

The power plant at Jayenne, W. Va., of the Fairmont & Clarksburg Traction Company, Fairmont, W. Va., which is equipped with General Electric generating units of 5000 kw. capacity, driven by gas engines and steam turbines, will be considerably increased in capacity. Two alternators of 1000 kw. each are to be installed in a building now under construction as an addition to the station.

The authorities at North Braddock, Pa., will soon be ready for bids on pumps, and probably electric motors, for the water works to be constructed there. Plans are now in course of preparation.

The representatives in this district of the Lambert Hoisting Engine Company, who are located at 117 Main street, Allegheny, Pa., have in hand numerous inquiries from quarry owners, mining and coal handling companies, construction firms, contractors and others for hoisting engines and cableways. This year electric hoists are more frequently specified than they have been heretofore.

The attention of large users has been quite strongly called of late by excellent service records to the new type of interpole motors, which are manufactured by the Burke Electric Company, Erie, Pa. These are capable of wide variations in speed, and have been found especially advantageous for certain classes of machine shop work.

It is reported from Moundsville, W. Va., that a new manufacturing plant of considerable size will be constructed there by the Railway Brake Shoe Company, for the production of the electric traction specialties indicated in its title. The machinery list will be large.

Further improvements are contemplated in the municipal water works system at Wheeling, W. Va., including a new pumping unit for supplying Wheeling Heights. An appropriation of \$132,000 has been asked for the purpose by the committee in charge of the work.

Dinky locomotives now form one of the best selling lines of the Lima Locomotive & Machine Company, Lima, Ohio, a new design embodying simplicity of operation and economy of fuel having recently been placed on the market. During the summer season the company has been enabled to accumulate a stock of these machines, so that prompt shipment can be made on orders.

The capacity of a sawmill included in the recent purchase by the Willson Bros. Lumber Company, Pittsburgh, of timber lands in West Virginia, will be enlarged and the equipment improved.

In addition to its original line, the Shunk Plow Company, Bucyrus, Ohio, is making a specialty of heavy scraper plows for road machines, which it carries in sufficient quantities for immediate delivery.

Another electric power plant, independent of any of those now in operation there, is to be erected in Altoona, Pa., this fall by a new organization known as the Pennsylvania Central Light & Power Company. The particulars are, however, not definitely known here, except in the office of a large manufacturing company that is said to be figuring on the equipment.

The Greenville Metal Products Company, Greenville, Pa., recently increased its capital stock from \$250,000 to \$600,000. The concern is hurrying work on its buildings, in which it will manufacture a line of automobile parts and steel specialties.

The Stewart Iron Company, Sharon, Pa., has awarded a contract to Taylor Brothers, local contractors, for the erection of a new concrete block laboratory, 20 x 50 ft., with a wing, 16 x 20 ft.

The Homestead Valve Mfg. Company, Homestead, near Pittsburgh, has completed the erection of a 30 x 100 ft. addition to its iron and brass foundry. This addition practically doubles its capacity in the foundry department. The company recently appointed the following new agencies: C. B. Ault, Kansas City, Mo.; Frank Boyle, Park Row Building, New York City.

The W. R. Beatty Machinery & Equipment Company, 30 Carson street, S. S. Pittsburgh, Pa., has been appointed sales representative for Pittsburgh and vicinity of the Blaisdell Machinery Company, Bradford, Pa., maker of air compressors. The Beatty Company will arrange to have several standard machines in its warehouse for exhibition purposes and to fill orders promptly.

The Fred F. Fischer Company, 1120 Park Building, Pittsburgh, now represent for that vicinity the following concerns: Nagle Corlies Engine Works, Erie, Pa.; Tower Engineering Company, Buffalo, N. Y.; Pennsylvania Boiler

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Works, Erie, Pa.; Trenton Engine Company, Trenton, N. J., and Bogart Gas Power Engineering Company, Buffalo, N. Y.

The G. M. Yost Mfg. Company, Meadville, Pa., has recently installed a lot of new machinery so as to take care of its increasing business. This company recently bought out the Williamson Vise Company, Bradford, Pa., and is making a very complete line of vises for all purposes.

The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has received an order from the La Blanca & Anexas Mining Company for 40 type MS motors, to be used in the company's mill at Pachuca, Mexico. The motors ordered range in size from 5 hp. on the pulp thickeners to 75 hp. on the tube mills. The order also includes seven 250-kva. O.I.S.C. transformers and one 12-panel switchboard.

### St. Louis

ST. LOUIS, August 22, 1910.

Leading dealers state there have been several buyers in town during the past week, particularly from Tennessee, and it is noted that an increasing number of visitors from that section are using St. Louis as their machine tool headquarters. Some business has also been placed with local dealers by parties from Springfield, Ill. The reorganization of the St. Louis Car Company is a matter of congratulation and attracts much attention from parties interested in machinery, &c.

The Railway Steel Spring Company's plant at East St. Louis, one of the largest owned by this interest, which specializes railroad on springs, is fairly full of work.

The shoe factories have been buying some little machinery for repair departments, maintained by most of the plants for keeping their manufacturing equipment in shape.

The St. Louis Portland Cement Company is well employed at its plant on the northern city limits. This is the pioneer of the three large cement factories near St. Louis.

One of the brick companies has just placed its order for a 72-in. boring mill.

The Standard Oil Company's large new refinery at Wood River, Ill., is now in full working order. It represents an investment of several million dollars, and is equipped with an elaborate machine shop capable of building cars when necessary.

The Aluminum Company of America, which has a huge plant at East St. Louis, is running along steadily on the products of its mines in Arkansas.

The East St. Louis Locomotive & Machine Company finds business fairly satisfactory for this season. Its specialty is rebuilding all classes of locomotive equipment.

The St. Joseph Steam Laundry Company, St. Joseph, Mo., has been incorporated; capital stock, \$20,000. The incorporators are S. O. I. Stone, Ella Stone, Nixon I. Stone and others.

The Citizens' Gas Company, Hannibal, Mo., has been incorporated; capital stock, \$40,000. The incorporators are W. E. Moss, A. M. Hart, J. W. Thompson and others.

The Smith Locomotive Adjustable Hub Plate is the title of a new company organized at Pittsburg, Kan., to engage in the manufacture and sale of the patented device described in its corporation name. It is estimated that this device will save at least \$1200 per year on each engine in taking up lateral motion. It has been for over a year subjected to a test by the Kansas City Southern Railroad. F. H. Smith is president.

Excavation work for the Richie Corrugated Iron Company's plant on Grand View avenue, Muscatine, Iowa, is to begin next week.

The repair shops of the Iowa Central Railroad are to be transferred from points along the line to Oskaloosa, Iowa, where the work will be concentrated.

The National Ruberette Company will soon erect a factory costing upward of \$50,000 in Des Moines, Iowa, for the manufacture of a puncture-proof compound for automobile tires. A. O. Ayers is the president and H. G. Jones is general manager of the company. There will also be established a plant for the treating of tires with the compound.

Kolosick Brothers will erect in Washington, Iowa, a factory, 35 x 100 ft., for the manufacture of stock dipping machines, dipping tanks, &c.

The National Lead Company has obtained a permit to erect a corroding shed at 5520-5534 Manchester avenue to cost upward of \$110,000, which will almost double the capacity of its plant. In addition, a \$6000 stable and \$5500 oil house will be built.

The Zittlosen Mfg. Company, St. Louis, Mo., has awarded a contract for the construction of a factory building, 60 x 126 ft., to be erected at a cost of \$30,000.

The Dalton Adding Typewriter Company, Poplar Bluff,

Mo., has awarded a contract for the construction of a three-story and basement reinforced concrete addition to its plant, 45 x 400 ft., to be erected at a cost of about \$100,000.

The Board of Public Improvements, St. Louis, Mo., will receive bids October 17 for the construction of a one-story and basement brick and steel boiler house, to be erected at Bissells Point at a cost of about \$350,000, including equipment.

The city of Columbia, Mo., will hold an election September 27 to vote on the issuance of \$120,000 in bonds for installing a new municipal water and lighting plant.

At a meeting of the directors of the Mapleton Gas Company, Mapleton, Iowa, it was decided to reorganize the company and install new machinery.

The Lennox Furnace Company, Marshalltown, Iowa, has increased its capital stock from \$250,000 to \$350,000 to provide for an issue of \$100,000 of 7 per cent. preferred stock. The new capital will be used in the extension of the manufacture of the Quick Action steel range with adjustable grate. It is the intention of the company to build in the spring a complete factory, plans for which have not been definitely decided upon at this time. The company will be in the market for all classes of equipment that pertain to a plant of this character.

The Des Moines Silo & Mfg. Company, Des Moines, Iowa, will build a steel frame lumber shed connecting with its present plant, 54 x 200 ft. The company is also considering the erection at Kansas City, Mo., of a factory, 120 x 240 ft.

### Milwaukee

MILWAUKEE, WIS., August 22, 1910.

Some of the manufacturers here have the orders on their books so far reduced that they are beginning to make a more vigorous campaign for business, and as fall approaches most Wisconsin concerns will be getting in line for their share of the trade. Additional salesmen are already being engaged or withdrawn from office forces for work on the road, and considerable advertising literature will be sent out during the next few weeks. In certain lines of production, however, the shops are still provided with orders for a long time ahead, and no special effort will be made to increase bookings before late autumn or early winter. At that time new business will be needed for the numerous factories or additions now under construction which will then be completed.

The Burlington Brass Works, Burlington, Wis., is preparing to install electric motors, which will be operated on current from the plant of the Burlington Light & Power Company. Vaughn & Meyer, Milwaukee, are in charge of the plans for improving the company's power system.

The municipal electric generating plant at Columbus, Wis., will be remodeled and its capacity increased.

The Albert Trostel & Sons Company, Milwaukee, is preparing to rebuild the portion of its plant that was destroyed by fire. A one-story building, 120 x 150 ft., will be erected, and provision may be made for electric motor drive.

Two hydraulic turbines, each direct coupled to a 250-kw. alternating current generator, will be bought for the municipal power plant at St. Croix Falls, Wis. Plans and specifications are reported to be in the hands of W. G. Kirchoffer, Madison, Wis., who is the city's engineer.

The Wisconsin Bridge & Iron Company, Milwaukee, has been given the contract for another machine shop, to be erected by the National Brake & Electric Company. This is additional to the buildings recently mentioned.

An effort is being made by commercial interests in Racine to secure for that city the new plants of the Thomas Brass & Iron Works and Durand Steel Locker Company, whose factories at Waukegan, Ill., were destroyed by fire.

The proposed installation of a municipal lighting plant is being discussed by the authorities at New Holstein, Wis.

Improvements, which include the installation of some new machinery, will be made in the factory of the Werheim Woodwork Company, successor to the Werheim Mfg. Company, Wausau, Wis.

The Ahnapsee Veneer & Seating Company, Algoma, Wis., is proceeding with plans for a two-story addition to its factory, 50 x 160 ft.

Among contracts recently awarded S. Freeman & Sons Mfg. Company, Racine, Wis., by municipalities is one for two boilers of 150 hp. each, to be installed in the city power plant at Batavia, Ill.

The electric generator for the new power plant of the C. B. Henschel Mfg. Company, Milwaukee, will be furnished by the Allis-Chalmers Company.

The Industrial Heating & Engineering Company, Milwaukee, has the contract for the heating plant, including



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two low pressure boilers, to be installed in a large parochial building at Fond du Lac, Wis.

The Milwaukee Structural Steel Company is starting work on a new fabricating plant, 60 x 130 ft., to be erected here, the power for which will be furnished by a gas engine. The principal contracts have been closed.

The contract for three new stokers to be used in the power plant of the Sheboygan Light, Power & Railway Company, Sheboygan, Wis., has been let to the Underfeed Stoker Company, Chicago, Ill.

The new warehouse to be erected by the International Harvester Company at Eau Claire, Wis., will be four stories, 85 x 120 ft., mill construction. The building contract has just been let.

The Radcliffe Mfg. Company, West Allis, Wis., has contract for the mill work on the new plant of the Milwaukee Machine Tool Company, at that place.

The A. Streich & Bro. Company, Oshkosh, Wis., is having plans drawn for a three-story addition to its factory, 46 x 136 ft.

The Northwestern Malleable Iron Company, Milwaukee, has arranged for the construction of four reinforced concrete storage buildings, each one story, 50 x 130 ft.

An independent steam heating plant, using blowers, will be required for the new office building of the Gisholt Machine Company, Madison, Wis., bids on which are about to be taken.

The address of the Clifton Light & Power Company, recently mentioned in this report, should have been given as Hudson, Wis., instead of Clifton, the president, B. W. Utman, being located at the former place. The contract for a power dam was recently placed, and the initial capacity of the electric generating plant will be about 400 kw. Current is to be transmitted to towns in the vicinity, as far as Hastings, Minn.

It is reported from Appleton, Wis., that two low pressure De Laval steam turbines of 75 and 300 hp. will be installed by the Thilmann Pulp & Paper Company, Kaukauna, Wis., to operate on the exhaust from Corliss engines.

The machine shop for repair work which has been operated by the Lange Canning Company, Eau Claire, Wis., in connection with its plant, was recently destroyed by fire.

A pump for fire protection service will be bought in the near future by the town of Gresham, Wis.

The General Electric Company, Schenectady, N. Y., has furnished for the plant of the Beloit Water, Gas & Electric Company a horizontal steam turbine and alternating current generator of 500 kw., making the total capacity of the station about 2000 kw.

It is reported from Ashland, Wis., that the Ross-Sellinger Company, whose present address is given as Sheboygan, Wis., will build a plant there for the manufacture of gloves. Power machinery will be among the requirements.

A factory addition, 30 x 40 ft., three stories, will be built at Fond du Lac, Wis., by the Longdin-Brugger Company for the manufacture of automobile tops. Brick and steel construction is to be used and provision made for electric power.

A rotary converter, to take current from the electric railway company's lines and change it for use in the factory, will be installed by the Allis-Chalmers Company in the new plant of the Helmholtz Mitten Company, at Cudahy, Wis.

Bids will be taken until September 1 by the State Board of Control, Madison, Wis., for two economizers to be installed in the heating plant of a State building.

C. W. Parry, Algoma, Wis., is having plans prepared for a factory building, 48 x 180 ft., two stories, to be used for the manufacture of opera chairs.

### The South

NASHVILLE, TENN., August 22, 1910.

Most of the business transacted at present appears to be of a routine character, and supplies of different kinds are figuring more largely in the sales of jobbing houses and dealers than orders for mechanical equipment. Very few representatives are on the road, and a large percentage of orders come in by mail unsolicited. Manufacturers have recently been planning their production for the fall and winter months, and in some instances season contracts have been made for standard articles as far ahead as next spring. There seems to be more assurance of a steady run of business than has been promised at this time of the year in any period with which comparisons can be drawn, and the outlook generally is excellent. For the immediate future plants utilizing some form of woodworking machinery will be among the leading buyers of equipment, including power units and electric motors, but in other lines of industry buying orders will follow very closely the revival of trade in September.

M. L. Shepherd, whose present address is given as Montgomery, Ala., has organized the Shepherd Automatic Switch Company of that place, to establish a plant for the manufacture of a special type of switch for use either on steam or electric roads. The company is incorporated for \$700,000.

The Calcasieu Veneer, Box & Crate Company has been formed at Lake Charles, La., and will install machinery in the plant formerly used by the Tupelo Ladder Company. H. E. Schrubbs, secretary of the company, will be in charge of the arrangements.

The St. Petersburg Electric Light & Power Company, St. Petersburg, Fla., which has a battery of Berry boilers, furnished by Robt. Wetherill & Co., Chester, Pa., is about to double its capacity by the installation of two more of 250 hp. each, from the works of the same company.

The Casey-Hedges Company, Chattanooga, Tenn., will supply an 18 x 72 high pressure boiler for the new municipal power and pumping plant at Wrightsville, Ga.

It is understood that in order to provide an adequate water supply for Ensley, Ala., there will be installed a pumping station of 25,000,000 gal. daily capacity at a point known as Camp Branch, about two miles distant, whence it will be conveyed to a reservoir above the city and distributed by gravity. The Tennessee Coal, Iron & Railroad Company is reported to have had plans drawn for the project, which will include the construction of a large dam.

The Halls Light, Water & Ice Company, Halls, Tenn., will arrange for the installation of a public service plant.

The proposition to establish an electric power station at Livingston, Ala., has come to a head in the organization of the Livingston Light & Improvement Company, which will arrange for the installation of the necessary machinery.

A large plant for the manufacture of commercial fertilizers will be erected in North Montgomery, Ala., by the F. S. Royster Guano Company, whose main office is stated to be at Norfolk, Va.

Plans for a new power plant, cutting machinery and crusher, as well as other improvements, are about to be put in effect by the Broad River Granite Company, at Oglesby, Ga. The main offices of the company are in the Candler Building, Atlanta, Ga.

Representatives of the Buffalo Forge Company, who are located at Charlotte, N. C., have found this a favorable season for the installation of exhaust fans in planing mills, woodworking plants and furniture factories for refuse removal systems. Other lines of trade are also fairly active for this time of the year.

The American Stone Company, Richmond, Va., which controls a large quarry near that city, is figuring on the installation of a compressor plant, power, crushing and handling machinery, including a locomotive crane.

The Lafourche Dredging Company has been organized at New Orleans, La., with Wilton E. Aymar as secretary, and will provide machinery enabling it to participate in the large amount of reclamation work that is projected in that vicinity.

Governor Sanders of Louisiana has recommended to the Legislature that an act be passed authorizing municipalities to vote special taxes in aid of manufacturing plants or other industrial enterprises, the location of which it is desired to secure for particular communities.

The Fulton Company, Knoxville, Tenn., will erect a brick building, to be used as a manufacturing plant, near the company's factory on Second street.

The veneering plant of Tillman, Shannon & Co., Trimble, Tenn., was destroyed by fire August 12. The loss is \$50,000, partially covered by insurance.

### The Northwest

ST. PAUL, MINN., August 22, 1910.

Bookings recently have been light. Purchasing agents and others responsible for placing orders in behalf of industrial operations are largely on vacations, having taken advantage of the pleasant weather to make trips to the Northern lakes and woods, and for various other reasons negotiations are slow. There is, however, considerable business pending that will be closed upon within the next few weeks, so that the situation is far from discouraging. For all standard lines the market is otherwise about as mentioned in this report a fortnight since.

The North Dakota Heat & Power Company, Fargo, N. D., is proceeding with plans for the installation of an electric power and lighting system at Energy, N. D.

The building of a pumping plant to serve the community is under consideration by the authorities at Hartford, S. D., and an engineer will probably be engaged shortly to submit plans.

The plant of the South St. Paul Electric Light, Heat & Power Company, the contemplated enlargement of which was recently noted, has passed under the control of the Gas and

## THE MACHINERY MARKETS

ers Power Company, Stillwater, Minn., which will carry out the projected improvements.

Last week 32 students of the University of Commerce, Cologne, Germany, made a brief survey of industrial conditions at Duluth and then left for Butte, Mont., for a series of similar observations. The trip is being made under the auspices of the German Government.

The authorities at Preston, Minn., have engaged an engineering firm to prepare plans for a hydroelectric plant for municipal service.

The Watertown Light & Power Company, Watertown, S. D., recently had work started on a large new electric generating station.

The Elk City Mines Corporation, Elk City, Idaho, is enlarging its crushing and ore concentrating plant. Machinery sufficient to meet present requirements has been provided for, but more will be needed as production increases.

A power and pumping plant is to be purchased in the near future by the Gilt Edge Mining Company, Elk City, Idaho.

The Twin City Equipment Company, Minneapolis, has the selling agency in this section for the improved line of steam dredges built by the Bellefontaine Foundry & Machine Company, Bellefontaine, Ohio. The demand for machinery of this class is increasing as the result of the amount of development work now in progress.

The municipal power and pumping station at Lakefield, Minn., is to be enlarged and improved. A gas producer and gas engine, with alternating current generator, will probably be required.

Bonds to cover an expenditure for pumping machinery will be issued shortly at Butler, S. D.

Some damage to its property was sustained by the Minneapolis Desk Mfg. Company, Minneapolis, from a recent fire, but the operation of the factory itself will not be interfered with.

The city of Farmington, Minn., will issue bonds for a pumping plant and water works system. An electric plant will be established by a private corporation.

The National Power & Paper Company, recently incorporated at Duluth, Minn., of which Chas. Schulze is president and J. P. Rossman is vice-president, will build an electric power plant and pulp mill in Lake County, Minn.

A one-story dry house, 34 x 110 ft., will be built by the Shenango Furnace Company on its property at Hibbing, Minn.

The St. Louis Hotel, Floodwood, Minn., will be remodeled and a heating and lighting plant installed.

The O'Donnell Shoe Company, St. Paul, Minn., is erecting a new factory and office building of reinforced concrete construction, 50 x 140 ft., five stories, which is to be completed by November 1.

### The Southwest

KANSAS CITY, Mo., August 22, 1910.

Need of machinery for the equipment of municipal power and pumping stations, together with the numerous lines of subsidiary apparatus made necessary by new construction work, pipe lines, reservoirs, fire protection, &c., still constitutes the heaviest support of the market, and buying on this account will continue an appreciable factor in the situation throughout the fall. From the larger cities some orders of very considerable size are in prospect. The rate of growth in population has been such as to far outstrip the average provision made for maintenance and extension of public utilities, and with the necessity for larger capacity has come a general demand for heavier, more economical, machinery. In quite a number of instances to be acted upon shortly obsolete equipment will be altogether eliminated, even though still capable of rendering some service.

The Cleburne Gas & Electric Company, Cleburne, Texas, which has in operation electric generating sets of 300 kw. capacity, is about to build a large new power plant.

The new industrial community of Pearson, in the State of Chihuahua, Mexico, for which a steam turbine power plant was recently ordered by D. F. S. Pearson, owner of the Mexico Northwestern Railroad Company, will be made the center of important operations. A new sawmill is in process of construction, and a box factory will soon be under way. Other plants are to follow.

The installation of pumping machinery is under consideration by the authorities at Hearne, Texas.

The Arkansas City Portland Cement Company, Arkansas City, Ark., which was recently organized, is reported to have plans in hand for a large cement mill.

The Ozark Electric Light & Power Company, Ozark, Ark., is contemplating the installation of a gas producer plant, gas engine and alternating current generator of 75 to 100 kw.

Some new machinery for quarrying and cutting is being installed by the Sinclair Quarry Company at Carthage, Mo., and more will be needed later on.

A tilting furnace of the Harvey-Steele type will be installed by the Socorro Mining Company at Mogollon, N. M. It has already been ordered.

The Loewer Wire & Iron Works, Kansas City, is busy on orders for ornamental iron to be used in large buildings. The use of this material appears to be rapidly increasing in various parts of the Southwest.

The Ft. Scott Gas & Electric Company, Ft. Scott, Kan., which has an engine driven power plant of 400 kw., is having plans drawn for the enlargement of its electric generating and distribution system.

The contract for a filtration plant at Graham, Texas, has been given to the New York Continental Jewell Filtration Company, New York City.

Some new equipment has been ordered for the Bisbee Coalition Mining Company, Bisbee, Ariz., which represents a consolidation of properties in that vicinity, and additional machinery will be required later as development work progresses.

Power and timber cutting machinery will be required for a new mill to be built at Carthage, Texas, by J. C. Whitney.

The construction of a municipal power and lighting plant is about to be undertaken at Kiowa, Okla.

The Board of Trade at Camden, Ark., has arranged for the construction of a large cooperage plant. Further particulars can be obtained from the secretary.

The principal machinery has now been purchased for the large new generating plant of the Kansas Gas & Electric Company at Wichita, Kan., but some additional and subsidiary equipment will be required during the late fall or early winter.

The mechanical equipment of the Forrest City Box Company's plant at Forrest City, Ark., is being enlarged.

An electric power plant will be provided in the near future for Antlers, Okla., by the Antlers Light & Power Company, recently organized for that purpose.

It will be necessary before a great while to install a new pumping engine at Houston, Texas, as practically the entire supply of the city is now provided by the 25,000,000 gal. unit last purchased, the remainder of the machinery being unfit for sustained service.

Plans are about to be put into effect for a four-story addition to the plant of the Eller Wagon Company, Houston, Texas.

Engineers have been engaged by the city of Muskogee, Okla., to prepare plans for increasing the capacity of the pumping station.

The Board of Education of Wichita, Kan., is considering an expenditure of \$50,000 for an electric light plant and equipment for the high school.

The Southwestern Iron Company, Guthrie, Okla., which recently increased its capital stock from \$100,000 to \$200,000, will build an addition to its present plant, 60 x 150 ft., to be used as a structural iron shop. There will be installed in the new building a punch, an air compressor, air tools for riveting and drilling and such other tools as are necessary for handling structural material. It is understood that this equipment has not been purchased.

The Faeth Iron Company, Kansas City, Mo., will build a six story and basement concrete factory building, 111 x 260 ft., at an estimated cost of \$150,000, to be completed by January 1.

The Board of Regents of the school for the deaf at Sulphur, Okla., will ask for bids for constructing a steam and electric power plant at an estimated cost of \$12,000.

The plant of the Crystal Ice Mfg. Company, Argenta, Ark., will be enlarged at an expenditure of about \$50,000.

The Bessemer Gas Engine Company, Tulsa, Okla., will erect a warehouse for the accommodation of its increasing business.

The American Sash Weight & Mfg. Company of Muskogee, Okla., has been incorporated; capital stock, \$2400. Incorporators—P. F. Gambill, F. M. Woods, W. Y. Dilley and others.

Proposals for constructing bridges and culverts will be received by the City Secretary of Waco, Texas, for constructing one 54-ft. span steel girder bridge and abutments; one 22-ft. span I-beam bridge and abutments; one 20-ft. span reinforced concrete culvert; one 7-ft. span reinforced concrete culvert, according to plans and specifications.

An electric light plant is to be installed at Flatonia, Texas. T. M. Spinks will take charge of the property. An investment of \$15,000 will be expended in the enterprise.

The Marshall & East Texas Railroad has broken ground in Marshall, Texas, for the erection of its new shops.

The Southern Pacific Railroad will erect a new building at Houston, Texas.

The National Lumber & Creosote Company will erect a new plant at the junction of the Great Northern and the Houston & E. & W. Texas railroads, Houston, Texas. The buildings will be of brick, and will be fitted with all modern machinery. About 150 men will be employed.



## THE MACHINERY MARKETS

### San Francisco

SAN FRANCISCO, August 17, 1910.

A gradual increase of business is noted by local machinery merchants and manufacturers and the movement in general lines is probably up to the average for this season, dullness in some departments being balanced by unusual activity in others. Some lines which have been very quiet for the last few months are now beginning to receive some inquiry. New tools are not in demand locally, though a good many old tools are changing hands, and there is a constant inquiry for second-hand machines. A few machine tools have been sold to southern California shops, but none of these sales are of a very important nature, and the demand in that quarter is still somewhat curtailed by the strike at Los Angeles. Local dealers have sold several large machines to the Ajax Auto Traction Company, which is equipping a large machine shop at Portland, Ore.

Gas engine manufacturers are getting a heavy volume of business in the interior, though engines of Eastern make are used to a large extent for operating irrigating plants, agricultural and creamery machinery. The local factories are very busy on some large orders taken early this month for delivery to New Zealand and Australia. The export-business to those places is considered more or less temporary, however, as manufacturers there are conducting experiments with internal combustion engines, and it is believed that they will be able to supply their own market within a few years.

Equipment for general construction work is in very fair demand, including hoisting engines, donkey engines and boilers, concrete mixers, &c., and in view of large contracts recently let for concrete construction and harbor improvements the outlook is good for continued demand in this line. Crushers also are an important factor, and there is some demand for cement and brick manufacturing machinery. Road machinery is still one of the leading features, but some curtailment in this line is anticipated with the approach of the rainy season.

Pumps continue to find a ready market. The greatest demand is for small gasoline or electric pumps, though there is some inquiry for larger units for use in mines and water works.

Woodworking machinery, which was rather quiet early in the summer, has been coming ahead for the last month, as the activity of the lumber market necessitates considerable additional mill equipment, and several purchases are expected in the near future to replace several mills recently destroyed by fire. The new sawmill of the Pacific Lumber Company, Eureka, Cal., one of the largest on the coast, was completed August 15. The Terry Lumber Company has purchased several large machines for its mill at Bella Vista, Cal. C. E. Ring is working on a project for a general woodworking plant at Eureka, Cal.

It is reported that the Northern Electric and Vallejo & Northern railroads will install large car shops near Sacramento, Cal., following an agreement in regard to the construction of a bridge over the Sacramento River by these roads in co-operation with Sacramento and Yolo counties.

The Hydraulic Clutch Company is looking for a factory site at Vallejo, Cal.

An inquiry is expected from the Government shortly for a hydraulic forging press for the Mare Island Navy Yard.

Plans have been completed for a new Southern Pacific machine shop at Santa Barbara, Cal.

The California Boiler Works has let contracts for a large one-story building on the site at First and Howard streets, San Francisco, formerly occupied by the Crane Company.

Clifford E. Coggins, formerly master mechanic for the Imperial Valley Transportation Company, has started a machine shop at Imperial, Cal.

The Frontier Foundry Company has been incorporated at Los Angeles, Cal., with a capital stock of \$25,000, by W. W. Walsh, A. Morganti and B. D. Carle.

The Pittsburg Foundry Company, recently incorporated at Los Angeles, is having plans drawn for a foundry building on North Main street, that city, where new machinery will be installed.

The Union Iron Works will install oil burning equipment in three small steamers of the Western Fish Company, San Francisco.

The Santa Cruz-Portland Cement Company, San Francisco, will add a lot of new machinery to its cement plant at Davenport, Cal., during the winter.

The Consolidated Gas & Electric Company has purchased a tract of land at San Diego, Cal., where it will erect a large gas manufacturing plant, with the largest gas holder in the State.

John Rapp & Sons, a local bottling firm, have let con-

tracts for a new plant, in which they will install a complete outfit of bottling and refrigerating machinery.

The S. Bear Gold Mining & Extraction Company is installing a large crusher, three concentrators, pumping equipment, &c., in its plant at Sacramento, Cal.

Plans are being made for electric lighting machinery for the court house and jail of San Joaquin County, Cal.

The Standard American Dredging Company, which has a contract for deepening Pearl Harbor, Hawaiian Islands, has let a contract for a 6000-hp. suction dredge.

The city of Santa Cruz, Cal., is planning for the reconstruction of the municipal pumping and lighting plants.

Hind, Rolph & Co., a local shipping firm, have under consideration a project for the erection of a large repair shop on the Alameda, Cal., water front.

The supervisors of Monterey County, Cal., will receive bids September 7 for electric lighting and pumping machinery for the county hospital. Figures are being taken on the power house for the new San Francisco Hospital.

The city of San Bernardino, Cal., is considering the installation of a municipal light and power plant.

The Phillips Contracting Company is preparing to move its rock crushing plant from San Bernardino to Corona, Cal., and install a large amount of new machinery.

### The North Pacific Coast

PORTLAND, ORE., August 19, 1910.

The demand for machinery depends less at present on a few leading industries, such as logging and mining, being more diversified than it was earlier in the year. For the coming quarter this condition will undoubtedly be accentuated, with corresponding benefit to the trade at large, as a slump in any particular direction has less effect upon the industrial situation as a whole. It is, in fact, very gratifying to the commercial interests of this section to note the growth of general manufacturing on the north coast, and by means of the various associations of business men in the several leading trade centers everything possible is being done to encourage it. This month the total of bookings for new machinery, supplies and repairs will show up very favorably, considering the time of year, and for September the prospects are generally good.

The Adrian Power & Water Company, has been organized at Adrian, Wash., to establish a public service plant.

A new power plant, hoist, &c., have been put in service this season by the Listen Lake Gold Mining Company, whose headquarters are at Baker City, Ore., and further purchases of mechanical equipment will be made as the property is developed.

The Smith & Watson Iron Works, Portland, Ore., have started work on a new forge shop, 60 x 130 ft., which will replace two smaller structures. It is reported locally that Frank McDonough, president of the McDonough Mfg. Company, Eau Claire, Wis., will become identified with the business, and that the works above mentioned will be utilized extensively for the manufacture of sawmill machinery, which is the McDonough Mfg. Company's specialty, the Portland concern to be known henceforth as the Smith-McDonough Company. This has not, however, been officially announced.

It is reported from Vale, Ore., that the commercial interests there expect to secure for the city the new shops of the Oregon Railway & Navigation Company and the Oregon Short Line.

A woodworking plant, the main building of which will be 100 x 200 ft., is about to be erected at Kenton, Ore., by the Nicolai Door Mfg. Company. It will be driven through-out by electric motors.

Figures are expected to be taken shortly by the Ransome-Crummey Company for one of the largest rock crushing plants in this section, to be operated in connection with quarries at Klamath Falls, Ore. Other machinery will also be required.

Equipment is being provided by the Pacific Ore Company for a new 100-ton reduction plant at Republic, Wash. The crusher, which will be placed in operation first, is to be of the Gates gyratory type.

The Anacortes Water & Electric Company, Anacortes, Wash., has added to its engine driven power plant a Curtis steam turbine generating set of 400 kw., supplied through the Seattle office of the General Electric Company.

The contract for a new bridge to be built at Irondale, Wash., in the vicinity of the steel mills, has been let to W. H. Davis, Olympia, Wash.

The Little Spokane Water Power Company, recently organized, will build a large hydroelectric generating plant and pumping station in the vicinity of Milan, Wash. The plans of the company are, however, not yet complete.

The Pacific Coast Condensed Milk Company, Forest

## THE MACHINERY MARKETS

Grove, Ore., is reported to contemplate the erection of a new factory at Tillamook, Ore.

The Southern Oregon Water Power Company, Lakeview, Ore., has been incorporated with \$300,000 capital stock to develop the water power on Warner Creek, in Lake County, Ore. Work will be started soon on the construction of a \$140,000 power plant. The officers of the company are: F. H. Oliver, president; M. R. Jennings, vice-president, both of Spokane; E. K. Erwin, secretary and treasurer, Coulee City, Wash.

### The Farther Central West

OMAHA, NEB., August 22, 1910.

While the demand for machinery in all of the industrial districts east of the mountains remains light there is more talk of projected plant extensions or improvements, and figuring on future requirements is becoming quite general, indicating the inauguration of a buying movement by the middle of September or first of October which will be of enough importance to justify laying in heavy stocks. Branch houses and dealers, as well as local manufacturers, are already anticipating this condition, with the result that deliveries are likely to be very promptly made on orders placed early in the fall season. There is a very reasonable hope that any congestion like that of last year can be altogether avoided. In the mining country ordering of equipment is steady and promises to average well for an indefinite period.

The Lewis Electric Light & Power Company has been organized to establish a public service plant at Lewis, Iowa.

An elevated steel water tank of 80,000 gal. capacity is to be erected for municipal water service at Hartington, Neb.

T. F. Stroud & Co., Omaha, Neb., are putting on the market a steel frame elevating grader, which combines light draft with great durability in service. This season it has been sold extensively to contractors and communities all through the West.

The plant of the Wyoming Electric Light & Power Company, Basin, Wyo., which is at present equipped with a 75 kw. engine driven generator, has been purchased by the city and will be improved.

A shaft house will be erected and new machinery ordered for the mine of the Gilpin Orion Gold Mining Company, near Central City, Colo., of which W. E. Meagher is manager.

The Canon Light & Power Company, of which P. H. Dodge, Colorado Springs, Colo., is one of the incorporators, has been organized to build a hydro-electric plant in that vicinity, the machinery requirements of which will be large. No purchases, however, will need to be made for some time.

The Omaha Structural Steel Works, Omaha, Neb., will increase its capital stock from \$25,000 to \$200,000. The company will erect a modern plant for the manufacture of structural steel of every description. The present officers

are John W. Towle, president, and C. A. Pratt, secretary and general manager.

Polenske, Schellak & Co., Hastings, Neb., manufacturers of brick, whose plant was recently destroyed by fire, are now rebuilding their kilns and advise that as soon as they can make arrangements a dryer system will be installed and that new brick machines, crushers, &c., will be purchased. They are contemplating the use of electricity for motive power, in which case a number of motors will also be purchased.

### Government Purchases

WASHINGTON, D. C., August 23, 1910.

Bids will be opened October 20, 1910, at the U. S. Engineer's Office, Vicksburg, Miss., for one self-propelled hydraulic dredge, including steam plant, propelling machinery, electric plant, pumping engine, condenser and evaporator plant, sand pump, suction pipe and ladder, winches and refrigerating plant.

The Navy Department, Washington, will open bids October 1 for power plant at the U. S. Naval Academy, Annapolis, Md.

Paymaster General, Navy Department, Washington, will open bids August 30 under Schedule 2809 for one set of gasoline machinery for motor barge and under Schedule 2791 for one steam locomotive crane.

The Isthmian Canal Commission, Washington, D. C., opened bids August 15 as follows:

Class 1.—For 320 water meters, ½-in., and 25 water meters, ¾-in.—Bidder 1, Builders' Material Supply Company, Kansas City, Mo., \$2513.95; 2, The Crane Company, Washington, D. C., \$2697.30; 3, The Hersey Mfg. Company, Boston, Mass., \$4282.80; 7, The National Meter Company, New York City, \$4508; 8, The Neptune Meter Company, New York City, \$3067; 9, The Standard Water Meter Company, Brooklyn, N. Y., \$2860; 10, The Thompson Meter Company, Brooklyn, N. Y., \$3003; 12, Henry R. Worthington, New York City, \$2406.50.

Navy Department, Washington, D. C., opened bids August 16 as follows:

Class 1.—For one 1100-lb. single frame steam hammer—Bidder 50, Eccles & Smith Company, San Francisco, Cal., \$1470; 72, The U. T. Hungerford Brass Company, New York City, \$1623; 98, Manning, Maxwell & Moore, New York City, \$1500; 115, The Niles-Bement-Pond Company, New York City, \$1522; 124, The Pacific Tool & Supply Company, San Francisco, Cal., \$1500.

Class 31.—For one automatic hobbing gear machine—Bidder 98, Manning, Maxwell & Moore, New York City, \$1585, \$3124; 121, The Perrine Machinery Company, Seattle, Wash., \$4788.35; 141, Schuchart & Schutte, New York City, \$4788.55.

Class 71.—For two lathes—Bidder 5, The Aumen Machinery & Supply Company, Baltimore, Md., \$1202.50; 61, The Garvin Machine Company, New York City, \$1284; 98, Manning, Maxwell & Moore, New York City, \$1640, \$1510; 115, The Niles-Bement-Pond Company, New York City, \$1510, \$1185.

Class 72.—For three automatic gear cutting machines—Bidder 60, Gould & Eberhardt, Newark, N. J., \$6005; 88, J. P. Kemp, Baltimore, Md., \$6017.

Class 81.—For one motor driven screw machine—Bidder 118, The National Acme Mfg. Company, Cleveland, Ohio, \$2689, \$2230.

### Census Figures of Cities

The following are the population figures according to the thirteenth census of the 16 leading cities thus far reported:

| City.             | Population<br>1910. | Gain.   |
|-------------------|---------------------|---------|
| St. Lou's.....    | 687,029             | 111,791 |
| Pittsburgh.....   | 533,905             | 82,493  |
| Detroit.....      | 465,766             | 180,082 |
| Milwaukee.....    | 373,857             | 88,542  |
| Cincinnati.....   | 364,463             | 58,561  |
| Newark.....       | 347,469             | 100,399 |
| Washington.....   | 331,069             | 52,351  |
| Jersey City.....  | 267,779             | 61,346  |
| Kansas City.....  | 248,381             | 84,809  |
| Indianapolis..... | 233,650             | 64,486  |
| Providence.....   | 224,326             | 48,729  |
| St. Paul.....     | 214,744             | 51,679  |
| Columbus.....     | 181,548             | 55,988  |
| Toledo.....       | 168,497             | 36,675  |
| Atlanta.....      | 154,839             | 64,967  |
| Syracuse.....     | 137,240             | 28,875  |

### The Newhall Engineering Company's New Yards.

The George M. Newhall Engineering Company, 136 South Fourth street, Philadelphia, Pa., has its new yards in operation at Williamsport, Pa., where it is storing a large tonnage of relaying steel rails and splice bars. It is carrying all sections of relaying rails in stock for prompt shipment, and recently completed

the delivery of about 3000 tons of 60-lb. rails to various concerns on the Barge Canal, New York State. A number of other orders for sections from 70 to 85 lb. have been completed. The new yards have a capacity for 20 cars on track at one time and are equipped with special unloading devices. The company is also making a specialty of rail joints, which it is carrying in stock to fit all sections of rail, from 16 to 100 lb. per yard.

The Oklahoma Steel, Iron & Wire Fabric Company, Enid, Okla., which was organized last spring with a capital stock of \$50,000, advises that it has since that time erected and fully equipped a building, 160 x 220 ft., for the manufacture of field and ornamental fencing, reinforcement mesh for concrete, &c., sheet metal goods, fire escapes and other goods of similar nature. A complete machine shop is included. The company would like to secure the services of a thoroughly experienced man who is familiar with the manufacture of sheet metal goods to act as general manager.

The Omaha Structural Steel Works, Omaha, Neb., has increased its capital stock from \$25,000 to \$200,000 and is considering the purchase of a tract of 5 or 6 acres of land with trackage facilities, upon which it will erect a plant of much larger capacity than the one now operated for the fabrication of structural steel.



## Personal

Harry O'Brien, formerly sales manager of the Seaman-Sleeth Company, Pittsburgh, has resigned to accept the position of superintendent of the hot rolling mill department of the Superior Steel Company, Carnegie, near Pittsburgh. Dan Lewis, formerly of the Algoma Steel Company, Sault Ste. Marie, Canada, takes his old position.

C. R. Gregg, formerly manager of the machinery department of the Scully Steel & Iron Company, Chicago, is now associated with Joseph T. Ryerson & Son in the mechanical department.

The Pittsburgh Coal Company, Pittsburgh, Pa., announces that J. H. Woods has been appointed manager of the lake shipping and fuel department at Cleveland, Ohio, succeeding J. A. Donaldson, resigned.

Mrs. Harriet Clark Fisher, owner and manager of the Fisher Anvil Works, Trenton, N. J., arrived home August 17 from an automobile trip round the world. She sailed for Europe July 19, 1909, in making the start on a journey replete with thrilling incidents. She had four companions, among whom was Harold Fisher Brooks, her nephew and secretary.

W. H. Wonfor, advertising and export manager of the Wm. Powell Company, Cincinnati, Ohio, will leave August 25 for a two months' business trip through Mexico.

Jennings S. Cox, Jr., general manager of the Spanish-American Iron Company's iron ore properties in Cuba, has arrived in New York for a stay of some weeks.

Howard H. Cook, who has been appointed assistant secretary of the American Iron and Steel Institute, in charge of the Institute's newly opened headquarters at 30 Church street, New York, has been connected for the past three years with the Bureau of Corporations at Washington.

The State Department has designated Dr. W. H. Tolman, director of the American Museum of Safety and chairman of the American Executive Committee of the International Committee on Social Insurance, a delegate on the part of the United States to the International Congress on Workmen's Insurance, to be held at The Hague, September 6 to 9. Among the questions to be discussed is the extension of social insurance to include others than workmen—that is, small trades people, shop keepers and farmers—provisions for widows and orphans by means of insurance, and insurance against unemployment.

James C. Wallace, Cleveland, Ohio, president of the American Shipbuilding Company, returned last week from a European trip.

E. T. Adams has resigned as chief engineer and manager of the gas and mill engine department of the Allis-Chalmers Company, West Allis, Wis., a position which he has held for the past five years. For many years he was the personal assistant of the late Edwin Reynolds in the old Edward P. Allis Company, and during that time specialized in low lift pumping, designing several of the largest and most efficient pumps of this class that have ever been built, notably those for the Thirty-ninth street station at Chicago, which gave a duty of approximately 150,000,000 ft.-lb. per 1000 lb. of dry steam, a 50 per cent. increase of economy over any previous mark. When the present Allis-Chalmers Company was formed he was manager of the pumping engine department, but resigned to go with the Westinghouse Machine Company as engineer in charge of the gas engine division. In this position he had charge of the design of the present Westinghouse large gas engine, the first built in this country for blast furnace and producer gas work. After nearly three years with the Westinghouse Company he returned to the Allis-Chalmers Company to take the position which

he has just resigned. He designed the present Allis-Chalmers gas engine. During the last three months Mr. Adams has been abroad studying progress there with the internal combustion engine, including the Diesel engine.

E. R. Bowen, who has been associated with the Carnegie Steel Company for a number of years, has been appointed assistant manager of sales at its Philadelphia office, representing also the Illinois Steel Company and the Tennessee Coal, Iron & Railroad Company in the same capacity.

E. C. Sattley, manager of the Monessen, Pa., plant of the Page Woven Wire Fence Company, has been elected a director of the company and a member of the Executive Committee.

H. T. Wigham, manager of the London, England, office of the United States Steel Products Company, is now in this country on his annual visit, and was in Pittsburgh this week. Mr. Wigham expects to sail for England on September 5.

E. Steytler, assistant sales manager of the Pittsburgh Steel Company, is lying seriously ill in St. Francis Hospital, in that city, but strong hopes are entertained for his complete recovery.

Charles C. Cluff has been appointed manager of sales for the New York district of the Carnegie Steel Company, succeeding Charles W. Baker, who has resigned. Richard Wayland-Smith succeeds Mr. Cluff as assistant manager of sales. These appointments are effective September 1.

W. L. Kluttz has been appointed general superintendent of the Thomas Division of the Republic Iron & Steel Company, Southern district, succeeding J. E. Johnson, Jr., resigned, taking effect September 1.

## Obituary

JOSEPH IRELAND IRWIN, Columbus, Ind., died August 13, at his summer home in Windermere, Ont., aged 86 years. He built the Indianapolis, Columbus & Southern Traction Company, the first traction line out of Indianapolis. He was president of the Union Starch & Refining Company, Edinburg, Ind. He was one of the founders of the National Tin Plate Company, Anderson, Ind., built in 1894-1895, and of a company of the same name which built a plant in 1897-1898 at Monessen, Pa., both owned now by the American Sheet & Tin Plate Company. President Harrison offered him the portfolio of Secretary of the Treasury, but he declined it.

EDWARD T. GILBERT, vice-president and treasurer of the Michigan Bolt & Nut Works, Detroit, Mich., died August 8.

OTIS H. CHILDS, chairman of the Executive Committee of the United Engineering & Foundry Company, Pittsburgh, Pa., died August 22 at Cleveland, Ohio, where he had gone for medical treatment. The cause of his death was apoplexy. He was 53 years old.

**The American Society of Engineering Contractors.**—This society, of which D. E. Baxter, 27 William street, New York, is president, and D. J. Hauer, 13-21 Park row, New York, secretary, will hold its annual convention in St. Louis, September 27, 28 and 29, in the Coliseum. The local Committee of Arrangements is E. H. Abadie, chairman; J. L. Westlake, W. C. Swartout and L. C. F. Metzger. Papers will be delivered by J. B. Goldsborough and Ed. Wegmann, both of New York, on "Dam Construction for City Water Supplies," and by George C. Warren of Boston on "Work Preliminary to Street Paving and Road Work." A banquet will be held, and several sight seeing trips will be made to important engineering work in and around St. Louis. The society has now nearly 800 members.

## Iron and Industrial Stocks

NEW YORK, August 24, 1910.

Prices of securities have shown a downward tendency, which may probably be attributed to the apprehension of a scarcity of money caused by the demand for moving the crops. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week has been as follows:

|                               |   |                               |     |
|-------------------------------|---|-------------------------------|-----|
| Allis-Chalm., com.....        | 9 | Pressed St., pref.....        | 95½ |
| Allis-Chalm., pref. 32 - 33½  |   | Railway Spr., com. 32 - 34    |     |
| Beth. Steel, com. 26½ - 28½   |   | Republic, com. 30½ - 34½      |     |
| Beth. Steel, pref. 57 - 59½   |   | Republic, pref. 94 - 95½      |     |
| Can., com. 8½ - 9             |   | Sloss, com. 57 - 59           |     |
| Can., pref. 67½ - 69½         |   | Pipe, com. 15 - 16½           |     |
| Car & Fdry, com. 47½ - 50½    |   | Pipe, pref. 57½ - 57½         |     |
| Car & Fdry, pref. 110½ - 110½ |   | U. S. Steel, com. 69½ - 73½   |     |
| Steel Foundries. 43 - 45      |   | U. S. Steel, pref. 116 - 117½ |     |
| Colorado Fuel. 30 - 32½       |   | Westinghouse Elec. 59½ - 62½  |     |
| General Electric. 144 - 145   |   | Am. Ship, com. 78 - 78        |     |
| Gr. N. ore cert. 54 - 57      |   | Chi. Pneu. Tool. 36 - 36½     |     |
| Int. Harv., com. 95½ - 98½    |   | Cambria Steel. 42½ - 43½      |     |
| Int. Harv., pref. 117½ - 118  |   | Lake Sup. Corp. 21 - 23       |     |
| Int. Pump, com. 40½ - 40½     |   | Pa. Steel, pref. 105½ - 108   |     |
| Int. Pump, pref. 81½ - 82½    |   | Warwick. 9½ - 10              |     |
| Locomotive, com. 34½ - 39     |   | Crucible St., com. 12½ - 12½  |     |
| Nat. En. & St., com. 16 - 16½ |   | Crucible St., pref. 76½ - 77½ |     |
| Pressed St., com. 34½ - 37½   |   |                               |     |

**Dividends.**—The Harbison-Walker Refractories Company has declared the usual quarterly dividend of ½ of 1 per cent. on its common stock, payable September 1.

Trustees of the Great Northern Iron Ore properties have declared a dividend of 50 cents a share, payable September 15. A dividend for the same amount was declared six months ago and \$1 a share a year ago.

The J. A. Fay & Egan Company, Cincinnati, paid August 20 the regular quarterly dividend of 1¼ per cent. on its preferred stock.

The Collins Gear & Motor Company, recently organized at Pittsburgh with \$250,000 capital stock, has purchased the plant of the Simpson Stove & Mfg. Company, Canonsburg, Pa., which has been idle for several years, and will change it into a plant for the manufacture of automobile axles, gears and motors. The new company will also erect another building, 60 x 300 ft., and expects to have the plant ready for operation about December 1. J. J. Flannery is president; D. P. Collins, vice-president and manager; J. M. Flannery, secretary, and H. A. Neeb, treasurer, all of Pittsburgh.

Announcement is made by James Bowron, vice-president of the Southern Iron & Steel Company, that on September 15 three open hearth furnaces and the blooming mill at the Alabama City, Ala., plant will be put in operation. It is also announced that a battery of 60 coke ovens will be put in operation at the Trussville, Ala., plant September 15, and that the furnace at Alabama City, Ala., will be blown in on basic iron about September 1.

The Western Pacific Railroad Company's first official passenger train through from San Francisco to Salt Lake was run August 18. Regular passenger service commenced August 22. The initial regular service consists of one train a day in each direction, with a running time between the two cities of about 36 hours. The new line is 921 miles long and has been in course of construction since September, 1905.

The new steel car ferry of the Marquette & Bessemer Dock & Navigation Company, which is being built to take the place of the one that was destroyed in a wreck late last season, will be launched at the Cleveland yards of the American Shipbuilding Company, September 3. It will be known as the Marquette & Bessemer No. 2.

The new lake freighter, the W. B. Dickson, named in honor of the first vice-president of the United States Steel Corporation, which is being built for the Pittsburgh Steamship Company, will be launched at the Ecorse yards of the Great Lakes Engineering Works, near Detroit, August 27.

## The Use of Cast Iron Borings in the Foundry

By briquetting cast iron borings they can be used in the cupola in the same manner that scrap or pig iron is used. A method suggested by the S. Obermayer Company, Cincinnati, Ohio, now manufacturing and offering for sale a briquetting borings compound, is as follows:

Use 50 lb. of the briquetting compound to 1 ton of borings, mixing thoroughly in a dry state. Add sufficient water to temper this mixture, making it of about the same consistency as an ordinary core sand mixture. Next take a box taper mold of ordinary boards, measuring, say, 6 x 12 in. at the bottom and 7 x 13 in. at the top, which will make a block weighing from 50 to 55 lb. The taper mold is preferred, as it enables the block to come out of the mold more easily. After filling the mold with the mixture of briquetting compound and borings, it can be compressed with a small hydraulic or molding machine or by a compressed air or hand press, or it can be rammed by hand equally well. The blocks should then be placed in a temperature of approximately 75 to 80 degrees and permitted to remain in that temperature for about 48 hours. They will then be ready for use and can be dropped in the cupola in the same manner as pig iron.

The suggestion is made that the briquettes should not be used on the bed of the cupola, but in the charges following. For instance, the pig iron can be placed in the cupola in the usual manner, then the quantity of scrap desired and then the quantity of briquetted borings. This method appears to give the most satisfactory results. From experience with this material, from 10 to 15 per cent. of borings may be used to each charge in the cupola.

On application of Thomas S. Davis and George W. Todd, stockholders of the Diamond State Steel Company, Wilmington, Del., which went into receivers' hands in 1905, Judge Holland of the United States Circuit Court, Philadelphia, Pa., appointed Ira J. Williams as ancillary receiver. The action was taken to facilitate the recovery of certain assets of the company.

H. H. McClintic and L. L. Elwel of the McClintic-Marshall Construction Company, Pittsburgh, fabricators of structural steel, have gone to Panama in connection with the large contracts for Panama lock gates taken about a month ago by that company.

The Deforest Sheet & Tin Plate Company, Niles, Ohio, closed its plant several days last week to enable it to make repairs to leaky boilers. All departments are again in full operation, with business booked that will permit steady operations for some time.

The Potts Brothers Iron Company, Pottstown, Pa., will on August 29 start its plate mill, which has been idle for 18 months. The puddle mill, which was shut down in February, this year, will be put in operation at the same time.

The Republic Iron and Steel Company has blown in an additional furnace at its Thomas, Ala., plant, making a total of three stacks now being operated on foundry iron.

Newfoundland last week celebrated the three hundredth anniversary of the first permanent settlement on the island by John Guy and a party of Pilgrims from England in 1610.

The National Tube Company has blown out its No. 1 furnace at Lorain, Ohio, and also its No. 4 Monongahela furnace at McKeesport, Pa.



## Sheet and Tin Plate Mill Strike Ended

At a meeting of the Executive Board of the Amalgamated Association, held in Pittsburgh August 23, it was decided to call off the strikes at the sheet and tin plate plants of the American Sheet & Tin Plate Company and also the sheet mill plants of the Youngstown Sheet & Tube Company, East Youngstown, Ohio, and the La Belle Iron Works, at Steubenville, Ohio, on August 27. This action, taken in spite of a recent vote of the members of the association against it, indicates that the officials of the association realize fully that the strikes at these different plants are hopelessly lost and nothing is to be gained by continuing them.

The strike at the plants of the American Sheet & Tin Plate Company started July 1, 1909, and was caused by the announcement that the plants of this company would be operated on the open-shop plan. Later the Youngstown Sheet & Tube Company and the La Belle Iron Works took the same stand and their men struck. These strikes were practically lost months ago, and the companies have been able to operate with nonunion men, with the exception of two or three mills of the American Sheet & Tin Plate Company, which it did not desire to operate. The sheet mills of the Youngstown Sheet & Tube Company and La Belle Iron Works have been in full operation for some months.

**The Keystone Steel Foundry Company.**—This company, with plant at Avonmore, Pa., on the West Penn Division of the Pennsylvania Railroad, on August 6 placed its new steel casting department in operation, and is now manufacturing a line of steel castings for miscellaneous uses. Its capacity is 75 tons a day, and includes castings from 1 lb. to 10 tons. The concern is engaged in the manufacture of iron castings for eight new open hearth furnaces for the Republic Iron and Steel Company, Haselton, Ohio, for which the Alex. Laughlin Company, Pittsburgh, has the contract. The daily capacity of the gray iron foundry of the company is from 16 to 20 tons. The concern will shortly install a new oxyacetylene welding plant for use in welding and cutting heads off of castings, which is a distinct improvement over the older method of cutting with cold saws. The company is now represented by the following agencies: Harry B. Hart, 303 Elks' Temple, Detroit, Mich.; Robert S. Bishop, Evans Building, Washington, D. C., and W. D. Curry, 431 Frick Building, Pittsburgh Pa. The officials are: Charles Biehl, president; John Sauers, vice-president, and John Weilersbacher, secretary and treasurer, and Louis H. Bregenzer, superintendent. The concern makes a specialty of steel castings for railroad and high-grade service and its gray iron foundry is specially equipped for mill work of all kinds. Its plant is operating to full capacity.

**The Argentine International Exposition.**—Circular No. 24, issued by the International Exposition of Railways and Land Transport at Buenos Aires, now in progress, and which is to end in November, has just been received. This circular comprises 24 pages of illustrations and descriptive matter. The text presents the history of the Revolution in 1810, which resulted in the independence of the Argentine Republic, in commemoration of which the exposition is now being held. It is an interesting narration of this most important event in Argentine history. Other articles give information to exhibitors and regulations governing the exposition. The illustrations are views of a considerable number of the principal buildings in the city, notable bridges, street scenes, docks and parks.

**New Railroad Equipment Orders.**—The *Railway Age Gazette* notes that the New Orleans, Mobile &

Chicago has ordered 200 flat cars and 100 box cars from the American Car & Foundry Company; the Nevada Northern, 175 Ingoldsby dump cars from the Pullman Company, and the Southern Indiana, 484 coal and 7 caboose cars from the Haskell & Barker Car Company. The Texas Pacific is building 300 flat cars at its Marshall, Texas, shops. The Kansas City, Mexico & Orient is in the market for 11 passenger cars. A contract for nine Pacific type passenger locomotives for Korea has been placed by the Japanese Government with the American Locomotive Company. An order has been placed with the same company by the United States Steel Corporation for 15 locomotives.

The Chandler & Price Company, Cleveland, Ohio, manufacturer of printing machinery, has let the general contract for a large foundry addition to its plant to the W. B. McAllister Company, Cleveland, Ohio. The contract for the structural steel work has been awarded to the Riverside Bridge Company, Martins Ferry, Ohio. The building will be of structural steel brick and concrete, with concrete floors, four stories and basement. It will be triangular in shape, 50 x 162 x 200 ft. The first floor will be used for storage, the second floor for a core room and cleaning room, and the third floor, which will be the highth of two stories, will contain the molding room. A wing will be built for a new power plant. Contracts for the equipment have not yet been placed. It will include about six molding machines, two 10-ton cranes, a jib crane, coal, ash and sand conveying machinery, and an elevator. The power plant equipment will consist of one 125-kw. and one 250-kw. generator, two 250-hp. boilers, stokers, water heaters, &c.

The Associated Foundry Foremen of Philadelphia and vicinity will hold a banquet at the Hotel Bingham in that city on September 24. Plans are under way for an elaborate affair, subscriptions for which have been placed at \$5 a plate. The following committee has charge of arrangements: President C. R. Brown, E. E. Brown & Co.; George M. Benkert, Fairmount Foundry Company; George W. Moore, J. W. Paxson Company; H. Bing, Bing Foundry Company; Thomas G. Smith, Midvale Steel Company; F. W. Robinson, W. C. Robinson & Co., and Secretary D. M. Kittenger, Pericoyd Iron Works.

The Wells Brothers Company, Greenfield, Mass., is sending the foremen of the various departments of the factory and their families on outings during the summer months. These outings take the form of all-day automobile trips through the surrounding country and to the nearby cities and towns. Usually two of the foremen are sent at each time, the company providing a touring car and paying all expenses. Each trip is about 125 miles long, occupying a full day. Dinner is arranged for at one of the hotels at the point of destination. These trips are all to different places, and have proved very enjoyable to the participants.

The Ingram-Richardson Mfg. Company, Beaver Falls, Pa., makers of porcelain enameled iron signs, has secured contracts for automobile license tags from the States of Connecticut, Massachusetts, Ohio, Michigan and Minnesota. These contracts will amount to about 300,000 plates. This company is putting up an addition to its plant, for which all contracts have been let and all machinery bought, work being pushed as fast as possible.

One of the Cherry Valley furnaces of M. A. Hanna & Co., at Leetonia, Ohio, was blown out last week, and will be relined if an examination shows the necessity for it.

### Warwick Iron & Steel Company Improvements

The Warwick Iron & Steel Company, Pottstown, Pa., is constructing an ore bridge to be used in connection with the Brown ore-handling apparatus, to replace two steam locomotive cranes which for the past 10 years have been used for handling ore in its ore yards and also for rehandling it to the ore bins of the furnaces. Following the installation of the Gayley dry air plant, the product of the company's Nos. 1 and 2 furnaces was so increased that it found the present steam cranes inadequate. On several occasions the furnaces were seriously embarrassed on account of railroad deliveries being held up by snow storms or other causes, when the steam cranes were called upon to handle all the ore from stock piles necessary to keep the furnaces in operation. Improvements in ore handling machinery at Buffalo, as well as prospective changes at Port Richmond, Philadelphia, made it necessary to provide for more prompt handling of cars, so as to give the cars quick unloading, which was impossible with the steam cranes.

When this company was using large percentages of lake ores the ore docks at Buffalo and Erie furnished a convenient storage place during the winter season, so that it was unnecessary to provide storage room at the furnaces for all of its winter requirements. With foreign ores largely replacing lake ores, it was necessary, however, to provide storage room at the furnace for a large tonnage of ore, as there is no storage place provided at Philadelphia by the receiving railroad companies. The vicissitudes of ocean navigation, together with the irregular supply of vessels to deliver the foreign ores to the port of Philadelphia, was another argument in favor of the erection of improved ore-handling machinery to enable it to handle material and also to escape possible heavy charges for detention of cars under rules of the Interstate Commerce Commission.

Influenced by these conditions it was decided to erect the Brown ore-handling apparatus, which is now in course of erection. It is estimated that with this improved equipment a saving of several cents per ton will be saved in the cost of production of pig iron.

**The St. Louis Car Company's Affairs.**—The new plan for the reorganization of the St. Louis Car Company, St. Louis, Mo., means, industrially and financially, very much to the city. John I. Biggs, the Milwaukee capitalist, will, it is reported, have an interest approximating \$1,000,000 which, with new money furnished by the president of the company, George J. Kobusch, and funds derived from the sale of the company's new preferred stock to a London syndicate, will, it is expected, realize \$2,500,000. The car company has had a capital stock of \$3,000,000, all common, and a bonded debt of \$685,000, according to *Poor's Manual*. Its gross business when operated to full capacity is \$10,500,000 a year, giving employment to 3700 workmen. The plant of the company, which is situated in North St. Louis, occupies 50 acres. Contracts have recently been accepted, representing a value of about \$700,000, for the building of cars. Some of the largest orders for cars have been received from the Harriman electric railroads in the Far West, while others came from New Orleans and Milwaukee.

The National Roll & Foundry Company, Pittsburgh, with plant at Avonmore, Pa., uses a considerable tonnage of steel castings each month, which it procures from outside sources. To bring the manufacture of this product within its own control, the company contemplates enlarging its foundry and installing two fair sized open hearth furnaces. The complete details have not yet been mapped out, but will be available a little later. The company's property consists of about 16

acres of level land, on which additions are erected from time to time to care for its growing business. It is installing a new 200-hp. water tube boiler.

In a recent issue of the *Amalgamated Journal*, the official organ of the Amalgamated Association at Pittsburgh, the companies named below are stated to have signed the Amalgamated scale for the year ending June 30, 1911:

Whitaker-Glessner Company, Wheeling, W. Va., and Martins Ferry, Ohio.  
National Enameling & Stamping Company, Granite City, Ill., and St. Louis.  
American Rolling Mill Company, Middletown, Ohio.  
Carnahan Tin Plate & Sheet Company, Canton, Ohio.  
Newport Rolling Mill Company, Newport, Ky.  
Pope Tin Plate Company, Steubenville, Ohio.  
Atlanta Tin Plate & Sheet Mill, Atlanta, Ind.  
Follansbee Bros. Company, Follansbee, W. Va.  
Empire Iron & Steel Company, Niles, Ohio.  
Thomas Steel Company, Niles, Ohio.  
De Forrest Sheet & Tin Plate Company, Niles, Ohio.  
Zug Iron & Steel Company, Pittsburgh, Pa.  
Youngstown Roofing Company, Youngstown, Ohio.  
N. & G. Taylor Company, Cumberland, Md.  
Top Mill Sheet Mill, Wheeling, W. Va.  
Licking Rolling Mill Company, Covington, Ky.  
Joliet Iron Products Company, Joliet, Ill.  
Texas Rolling Mill Company, Fort Worth, Texas.  
Cleveland Hardware Company, Cleveland, Ohio.  
Judson Mfg. Company, Oakland, Cal.  
Westerman Company, Lockport, N. Y.  
Cincinnati Horse Shoe & Iron Company, Cleves, Ohio.  
Griffiths Charcoal Iron Mills, Washington, Pa.  
Tyler Tube & Pipe Company, Washington, Pa.  
Union Sheet & Tin Plate Company, Marietta, Ohio.  
Ewald Iron Company, Louisville, Ky.  
Republic Iron & Steel Company.  
Brown & Bonnell Works, Youngstown, Ohio.  
Mahoning Valley Works, Youngstown, Ohio.  
Toledo Works, Toledo, Ohio.  
Inland Works, East Chicago, Ind.  
Tudor Works, East St. Louis, Ill.  
Corns Works, Massillon, Ohio.  
Sylvan Works, Moline, Ill.  
Gate City Works, Gate City, Ala.  
Western Bar Iron Association Mills.  
American Car & Foundry Company, Detroit, Mich.  
Empire Rolling Mill Company, Cleveland, Ohio.  
Fort Wayne Rolling Mill Company, Fort Wayne, Ind.  
Highland Iron & Steel Company, Terre Haute, Ind.  
Interstate Iron & Steel Company, East Chicago, Ind.  
Helmbacher Forge & R. M. Company, Madison, Ill.  
Helmbacher Forge & R. M. Company, St. Louis, Mo.  
Kansas City Bolt & Nut Company, Kansas City, Mo.  
Lake Erie Iron Company, Cleveland, Ohio.  
National Rolling Mill Company, Vincennes, Ind.  
Ohio Falls Iron Company, New Albany, Ind.  
Union Rolling Mill Company, Cleveland, Ohio.  
Railway Steel Spring Company, Detroit, Mich.

The World C. & C. R. Systems Company, Kirksville, Mo., manufacturer of cash and credit registers, has plans prepared for a new plant, which will cover 7½ acres. There will be 14 buildings, the largest of which will be 287 ft. in length, three stories. The company is negotiating with a number of cities which are trying to secure the new plant, but no definite decision has been reached as yet.

The Reliance Electric & Engineering Company, Cleveland, has just completed a contract for over 100 Reliance adjustable speed motors and Reliance constant speed motors for the Chicago Railways Company, Chicago, Ill. These motors are to be used to convert to individual drive the entire equipment of the latter company's machine and woodworking shops.

Isabella Furnace, No. 2, of the Carnegie Steel Company, in the Pittsburgh district which is being rebuilt, will be equipped with an external water cooling system, extending from the furnace top to the hearth jacket, the bosh being cooled in the same manner as that portion of the shell above the mantle. This equipment practically eliminates the use of cooling plates and the troubles usually incident to their use.



## The Vulcan Plow Company's Bonus System

The plan by which the Vulcan Plow Company, Evansville, Ind., gives an annual bonus to its deserving factory employees, was inaugurated by the president of the company, Major A. C. Rosencranz, in 1906. It was his desire that all who, by faithful service and hard work, were contributing to the successful operation of the business should share in its profits. The first year the plan was put in operation on a conservative basis, through the distribution of \$1300 among 22 foremen and workmen in amounts ranging from \$25 to \$150 each. The plan has since been enlarged from year to year, until in 1910 the total distribution approximated \$5000, with about 100 employees participating.

In general, participation has been limited to those who have been employed 12 months or longer, and who have shown interest in their work. The amount each man receives is based on recommendation of the superintendent, subject to revision by the president. Careful consideration is given to each workman as regards his skill, reliability and value as a producer, character and length of service.

In the foundry, where all molding is piecework, a method of scoring has been adopted by which the amount of bonus each molder receives is determined largely by a continuous record of his attendance and output of castings, kept by the foundry timekeeper. A certain sum (\$50) is allotted to each molder for a perfect record of attendance—i. e., upon condition that he put up his full floor of molds every day throughout the year. From this sum \$2 per day is deducted for every day lost and \$1 for every day that less than 90 per cent. of his floor is put up. In case of illness lasting more than one week, with the patient under a doctor's care, the deduction is reduced to \$1 per day.

A similar sum is allotted to each molder who carries the maximum amount of work that it is considered possible for an expert on each class of work to accomplish. Molders of less physical strength, energy and diligence share in proportion, as the total average amount of the piecework on their floors measures up to the maximum floor. Likewise a sum is set for a perfect record as regards discount or scrap castings, with smaller sums possible to molders whose discount amounts to 1, 2, 3, 4 or 5 per cent. of their regular floor.

In addition to these sums \$25 is allowed to all men whose general attitude and spirit are satisfactory. Usually all molders are included under this item. First year apprentices are permitted to share in the plan on a basis of one-half the amounts allowed to journeymen molders, and all other apprentices share alike with the older men.

The total of these four amounts constitutes the bonus paid to molders. Under this plan several first-class men have received \$100 or more, but the second grade workmen, who lose considerable time, receive but a comparatively small amount. This bonus is not considered as a part of a man's wages, but is rather a token of appreciation of valuable service rendered. No definite promise concerning it is made to the men, but it is the intention of Major Rosencranz to continue to make such an annual distribution as long as the profits of the business will justify it. In addition to the bonus fund set aside for the factory workmen, a sum is set aside for the salaried employees, which is usually distributed as a percentage on the salaries.

The bonus plan is an indication of the general policy of fair and liberal treatment of its employees by the company. In 1886 the working day was voluntarily reduced from 10 to 9 hours, on which basis it is still maintained.

The use of modern machinery and improved methods of manufacturing makes it possible to pay excep-

tionally high piecework and daywork rates. Deserving workmen are advanced in wages and grade of work as rapidly as their ability will warrant, and fair and impartial treatment is accorded to all. The shops are well lighted and kept free of dust by an efficient and exhaust system. Sanitary washrooms with shower baths and lockers contribute to cleanliness and comfort.

In case of accidental injury, whether the injured workman was at fault or not, medical attention is paid for by the company and one-half or more of the usual wages is given to injured workman while off duty. In addition, a Mutual Benefit Association, which pays sick and death benefits, is maintained by the employees and fostered by the company. Several employees have been assisted in the purchase of homes by arrangement with Major Rosencranz for monthly payments. All these things have aided in building up an organization of competent, contented and self-respecting workmen. Drunkenness is practically unknown, and profane or obscene language is seldom heard. The spirit of loyalty displayed by the employees is also very gratifying to the management.

## Western Canada and the Steel Duties

### A Tariff Problem for the Government

TORONTO, August 20, 1910.—When the Canadian Finance Minister communicated to the House of Commons last session the Government's purpose not to renew the bounties on iron and steel, he added that it was to be expected that the domestic manufacturers of iron and steel would ask for higher customs duties by way of compensation. The Premier's tour of the West must have convinced him that, however other productive interests might regard a proposal to increase the duty on iron and steel, the Western farmers would be against it. At its last annual meeting the Western Grain Growers' Association, in which a large proportion of the farmers is represented, the policy of the Government in the matter of fostering the home production of iron and steel was strongly condemned. The Provincial branches of this association in Manitoba, Saskatchewan and Alberta brought this subject to Sir Wilfred Laurier's attention in the course of his present visit to the West, and the Premier heard some very plain talk expressing the farmers' views. It was intolerable, he was told, that steel rails manufactured in Canadian works should be sold for \$24 a ton in the Punjab and for \$29 in Canada. The president of the Western Grain Growers' Association at Saskatoon pointed to some anomalies in the harvest machinery trade. The International Harvester Company has works at Chicago, Ill., and at Hamilton, Ont. The freight from Chicago to agricultural centers in Idaho is supposed to be about the same as from Hamilton to Saskatchewan. Yet, according to the Grain Growers' Association, the company sells its mower to the Idaho farmer for \$48 and to the Saskatchewan farmer for \$65. It is also a grievance of the Western farmers that self-binders made in Toronto are sold in England for \$147.24 and in the Canadian West for \$168.

Unquestionably the agricultural opposition to the bounties and duties on iron and steel, as well as to the protection of industries utilizing iron and steel as material, has been stiffened by the recent mergers and by rumors of other mergers. In the West, too, the antagonism to protection has been intensified by the disappointment with the crop in the southern belt. This year a large proportion of the farm population beyond the Great Lakes will have to make their money go as far as possible, and the disparity between Canadian and United States prices for agricultural implements and other products into which iron and steel largely or solely enter will be particularly irritating. As the next

session is expected to be the last before the general elections, it would be rash for the Government to do anything for the iron and steel industry by way of offsetting the abolition of the bounties, for Western Liberal members would have to vote against such an arrangement. If they failed to do so, they would find their seats in danger.

Western Canada now furnishes a large part of Canada's consumptive demand for steel. As there are not in the prairie country or within striking distance of it any domestic industries producing from the ore forms of steel other than rails, the West tends to look to mills and shops across the line for its staple steel articles, machinery, &c. The Western Canadian demand is, in fact, very largely tributary to plants in the Western United States. Unless steel industries and derivative works spring up in the prairie country, it will be difficult for the Government to justify there its adherence to the protective policy in relation to iron and steel and the principal products of these materials. If there were local industries of this fundamental character there might be more cogency in the argument that the farmer was getting the benefit of a capacious home market in return for the price paid by him for protection. But it is to the export market that the Western farmer looks for the sale of the bulk of his produce.

C. A. C. J.

## Curtailing the Lake Ore Output

### Several Mines Shut Down—Old Range Developments

MARQUETTE, MICH., August 20, 1910.—Oglebay, Norton & Co.'s Bristol mine, the largest producer in the Crystal Falls district of the Menominee range, has reduced its working force from 275 to 200 men. A new shaft is to be sunk at this property. Pickands, Mather & Co. have suspended work at their Charming and Warner explorations in the Amasa field, north of Crystal Falls. This shutdown, which is for an indefinite period, affects 50 men. Work at the Channing had been in progress two or three years and it was generally supposed that a mine was on the eve of development. Railroad facilities had been provided by the Chicago, Milwaukee & St. Paul Company. The Cambria Steel Company has trimmed down the force of employees at its Republic mine, on the Marquette range, to the extent of about 50 men. All operations at Rogers, Brown & Co.'s Ohio property at Michigamme, Marquette range, have been suspended. The adjoining Portland mine, owned by the same interests and which produces a similar grade of ore, will continue to be worked vigorously. The Portland is operated by the steam shovel method and its costs are materially less than at the Ohio.

The Antoine Ore Company's Traders' property at Iron Mountain, Menominee range, is in commission again, after having been idle a fortnight or more. Orders had been received to pull the pumps and cease production, and the workings had filled with water when new instructions directed the resumption of mining operations. A force of 125 men is now employed and shipments are again proceeding briskly. Some 75,000 tons have been sent out so far this season.

The Chicago property, midway between Iron River and Crystal Falls, is to be provided with shipping facilities this season. A branch line will be built by the Chicago & Northwestern Railroad and will also reach other properties of much promise. It is expected that the Chicago, Milwaukee & St. Paul will also tap the district in the not distant future, this with its proposed extension from Crystal Falls to the Iron River country. The Chicago is operated by the Buffalo & Susquehanna interests. It has been under development the

past few years and has opened a very considerable body of ore.

### Development and Exploration Work

A find of importance in the Crystal Falls field is the discovery at the Lot Three property of what appears to be a good sized deposit. The strike was made at a depth of 425 ft., where both drifting and cross cutting are in progress. The ore is free of rock, so far as cut, and that already hoisted appears of wholly satisfactory grade. The Lot Three is a property of the International Harvester Company.

The Steel Corporation is exploring the Hilltop tract at Crystal Falls. A diamond drill is being used and the property will be thoroughly and systematically tested. The Hilltop adjoins the 40, where Benjamin Neely of Negaunee drilled into a large body of ore some months ago, and it is believed that it carries the extension of that deposit. The Spring Valley Mining Company, auxiliary to the Wellston Furnace Company of Wellston, Ohio, and in which Eugene Zimmerman of Cincinnati is largely interested, is undertaking exploratory work in the Wisconsin portion of the Menominee range, midway between the Crystal Falls and Iron Mountain districts. The property to be tested is in Section 24, 40-17, 3 miles west of the Florence mine. The indications are very favorable. A contract for diamond drill work has been awarded to the Cole & McDonald Exploring Company. The Spring Valley Company already has developed the Zimmerman mine in the Iron River district, which is a fine property.

At its big Chapin mine, at Iron Mountain, the Steel Corporation is erecting one of the largest and most modern miners' dry houses on the Menominee range. The building is of stone and steel and will cost \$12,000. It will be 64 x 104 ft. in ground dimensions, will contain 660 steel lockers for the clothing of the men and will be equipped with shower baths and enameled wash fixtures. The construction will be in accordance with the very latest ideas in dry house erection and will be as near perfection from a sanitary standpoint as possible.

The Kloman Iron Company's property at Republic, Marquette range, is to be equipped with an engine and boiler house, 20 x 100 ft. The boiler plant will be of 200 hp. The engine, hoist and other equipment formerly employed at the Saginaw mine, at Norway, a Menominee range property abandoned a year ago, will be erected at the Kloman. The company's decision to install a plant of machinery would indicate that the exploratory work has been decidedly satisfactory. The Kloman is in the hands of the Jones furnace interests of Iron Mountain.

The United States Steel Products Export Company, 30 Church street, New York, has changed its name to United States Steel Products Company. The change in name is due to the fact that the company handles the entire foreign business of the subsidiary companies of the United States Steel Corporation, comprising all purchases of foreign material for their use as well as all exports of their products, in addition to which it conducts a construction business in foreign countries. The charter has been broadened, increasing its powers.

The plant of the Canton Iron & Steel Company, Baltimore, Md., and a quantity of crude and finished materials on hand, were sold at receivers' sale August 17. The plant was disposed of on a bid of \$55,100 to John Brown, while the materials on hand went to the same bidder at approximately \$13,000. While it is not known whom the bidder represented, it is believed that the plant and stock were bought for the Bauernschmidt interests.



## The New Cincinnati Cone-Driven Miller

While there is a recognized field for the heavy and powerful single pulley type milling machine which has been brought to such a high state of development, there is still a demand for a cone driven miller capable of handling work as fast and accurately as the other type. Appreciating this, the Cincinnati Milling Machine Company, Cincinnati, Ohio, has redesigned its entire line of cone driven milling machines, and the accompanying illustrations show the more important improvements that have been made. Fig. 1 is a view of the redesigned machine, while Figs. 2 and 3 are front and rear views of the gear box.

keynote of the entire design is simplicity, coupled with ease in operation, and all the feed changes are obtained through the 12 gears shown between the housings. The drive is direct from the face gear, which meshes with the feed gear A, and power is transmitted through the change gears mounted on the two shafts in the feed box to the gear B, which drives the universal joint shaft.

The tumbler construction is the most striking feature of this design and is in the form of a large diameter cylinder supporting the tumbler shaft and the gear and in turn supported in the frame of the feed box. This type of construction is said to eliminate all bending of the tumbler shaft, as well as vibration in the tumbler. While the tumbler operating lever projects through a hole in the feed box in the usual way, this

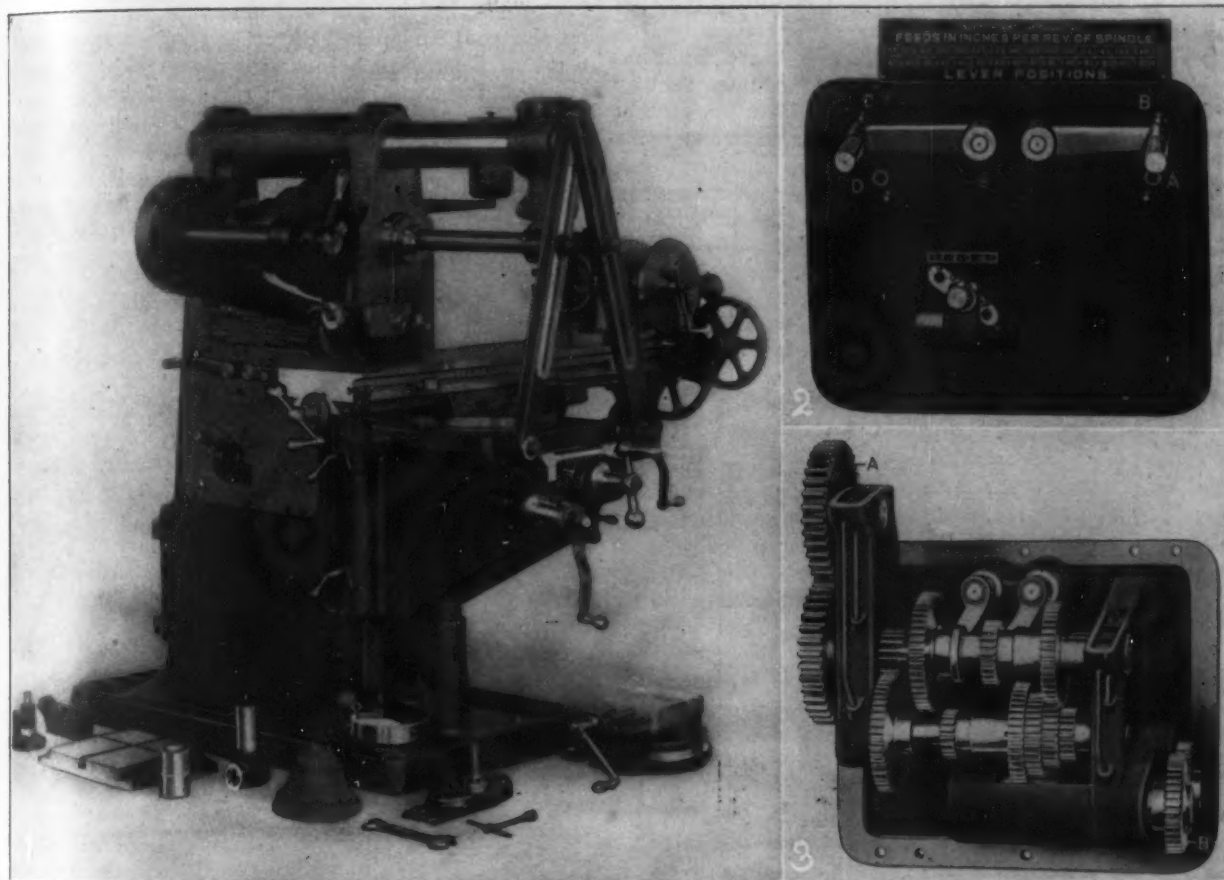


Fig. 1.—General View of the Machine.

Fig. 2.—Front View of the Gear Box.

Fig. 3.—Rear View of the Gear Box.

The Cone-Pulley Driven Milling Machine, Built by the Cincinnati Milling Machine Company, Cincinnati, Ohio.

The column is similar to that used on the high power machine and is a symmetrical box section with straight lines, large enough to contain the feed driving mechanism. A single group of gears mounted in the column at a sufficient height from the floor to bring all the operating levers within easy reach of the operator provide for feed changes, which range from 0.007 to 0.3 in. per revolution of the spindle. The lever arrangement and the feed index are shown in Fig. 2, and all of the 16 changes provided are obtained through the three levers shown. In making these changes one or all of the levers are shifted to correspond with the positions given on the feed index, which is mounted directly above them. This is of the same simple form as that used by this company on its line of high power machines and offers no chance for confusion, as the exact positions are plainly given below the figures representing the different feed rates and the operator simply has to move the levers to the positions indicated.

The inside of the feed changing mechanism is shown in Fig. 3. It is a single unit and when placed in the column becomes an integral part of the machine. The

opening is completely closed at all times and thus the inside mechanism is thoroughly protected from dust.

Scarcity of labor in many countries is forcing the farmers to adopt labor-saving machinery, according to the Bureau of Manufactures of the Department of Commerce and Labor. A bulletin it has issued shows that nearly \$30,000,000 worth of agricultural machinery was exported from this country in the fiscal year just ended, Russia and Argentina being the best markets. In Russia the competition is keen, as Germany sold about \$8,000,000 worth of farm machinery to that country in 1909 and England \$5,000,000 worth, while an estimate places the amount of American machinery sent there last year at about \$7,000,000.

The population of Canada on March 31 last was 7,489,781, according to the estimate of the Canadian Census Department announced August 8. The population in 1906 was placed at 6,441,000, so that in four years the increase has been approximately 1,000,000. The figures for 1901 were 5,338,883.





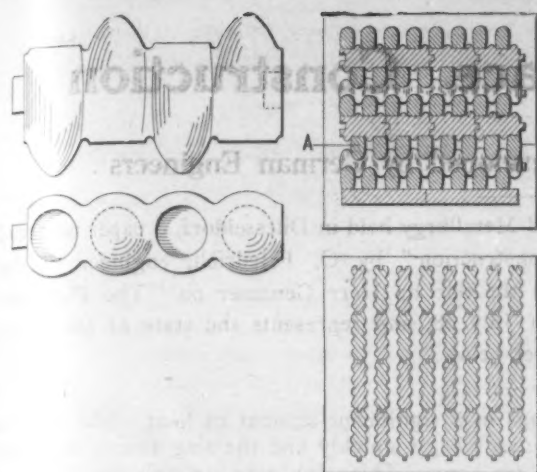


Fig. 3.—Knoblauch Shapes for Checkerwork.

protection against the clogging up of the checker work with dust. One method in use is to use larger bricks in the lower part of the regenerators, which gives more free space. Recently a large number of specially shaped bricks have been introduced, some of which are worthy of mention.

In Fig. 2 Dietrich's system and his shape of brick are clearly shown. These bricks have been in use for a year at the plant of the Westfälischen Company at Bochum. According to the inventor, they have given

very good service. The average is 800 heats for one 80-ton, two 60-ton and two 40-ton furnaces, which had neither slag pockets nor slag chambers.

In Fig. 3 are shown the brick and arrangement of Knoblauch, which is patented in Germany and other countries. These brick are characterized by elliptical

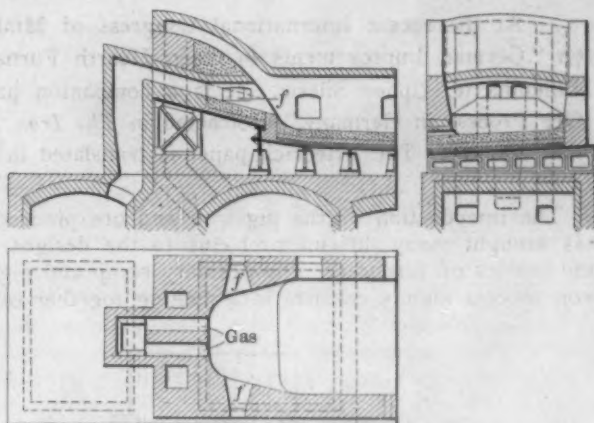


Fig. 4.—Dietrich Arrangement of Ports.

ribs cut off alternately above and below. When built up the bricks expose rounded surfaces in every direction and offer about 50 per cent. more surface and in the narrowed places 100 per cent. more free space than the ordinary construction. They offer great ad-

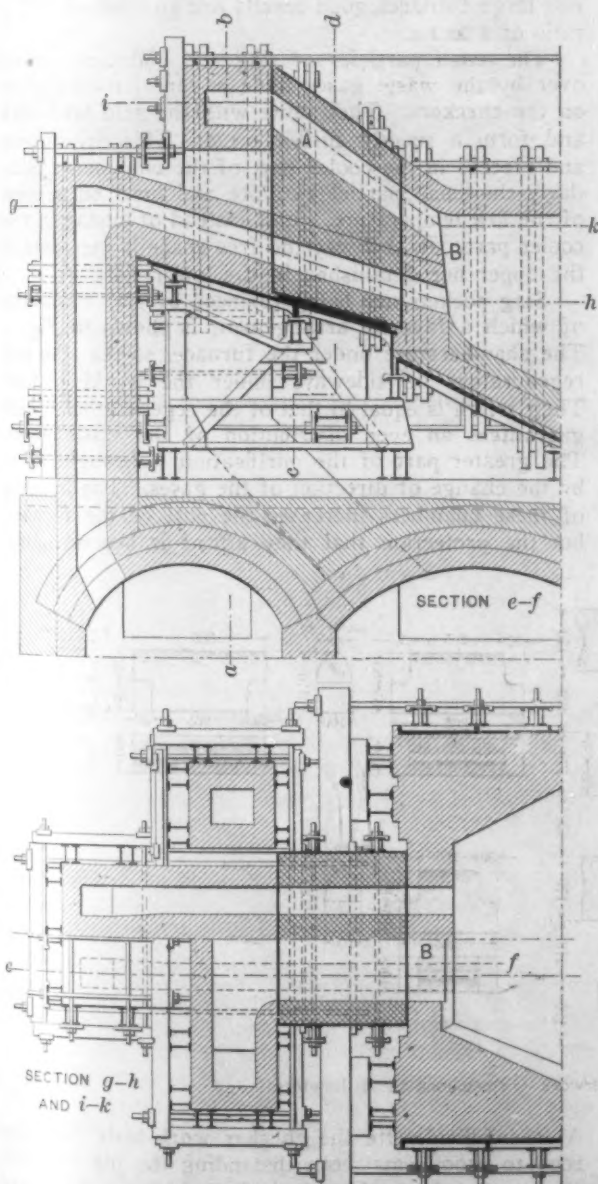
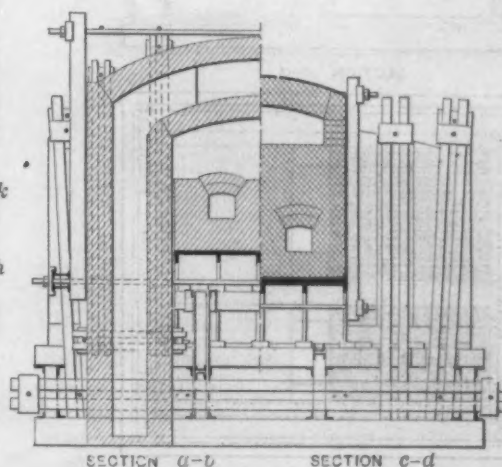


Fig. 5.—A Port Construction Which Permits of the Removal of the Front Portion. Vertical and Horizontal Sections.



vantages, especially in cases where the regenerators are not equal to the larger output desired from a furnace. These bricks are being tested at Witkowitz and Hubertshuette.

#### Changes in Port Construction

A horizontal direction of the gas and air ports has been abandoned altogether, but the angle of slope must not be too steep. The air port is generally made somewhat steeper than the gas port in order to give good mixture of the gas and air. The angle depends a good deal on the length of the hearth, but good figures for large furnaces are 30 degrees for the air and from 15 to 17 degrees for the gas.

Two gas ports are generally used on the Continent, covered by two fan-shaped air ports. At Julienne only one gas port is used, without impairing the distribution of the flame or the melting capacity of the furnace. In this way the front and back walls are protected and the melter can give better care to his ports.

With regard to the ports of the furnace all unnecessary brickwork is being done away with to allow good air cooling. Two methods are adopted to obviate the rapid destruction of the ports, which has such a harmful influence on the working of the furnace. The first is to prolong their life as much as possible by suitable

construction, and the other is to arrange for a rapid removal of the defective parts and replacement with new ones. Proper cooling has a great influence on the life of the ports, but air cooling is insufficient. Water cooling is not used to any extent on the Continent, so that a discussion of it is outside the field of this paper.

In Fig. 4 is shown Dietrich's arrangement of the ports, protected by a German patent. The gas port discharges into a front chamber and not into the hearth direct. This chamber is covered by a removable roof, extending from the front to the back wall and forming the floor of the air ports. The exit for the waste gases is therefore very large, thus avoiding obstructions and melting down at this point. The chamber is provided with side openings, through which ferromanganese, spiegeleisen, &c., can be introduced and heated. These ports are in use at the Westfaelische Stahlwerke, but the tests are not completed.

At the Julienhuette tests have been made on the other method—namely, providing for a quick change of the front part of the ports that becomes most quickly

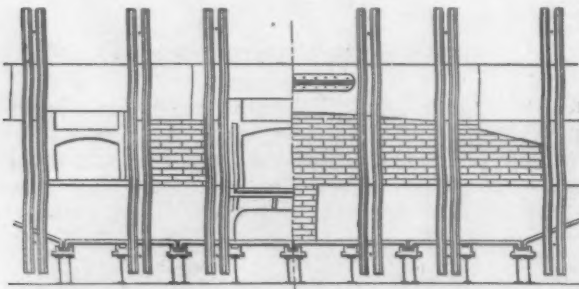


Fig. 6.—A Recent Method of Reinforcing Front and Back Walls.

destroyed. The arrangement is shown in Fig. 5 and is protected by patents. The air port lies directly over the gas port, but this has been found by experience to work all right; its cross section is greater than that of the two air ports together, which were previously used. The figure shows the changeable section used on a 40-ton furnace. It weighs about 20,000 lb. It is built on a cast steel plate and the roof of the air port is held in a frame, so that it can easily be lifted up.

The change is made by first taking away the supporting plates, then lifting off the roof of the air port and breaking away its side walls. The large solid part resting on the plate is then removed. The new part, carefully built up and dried, is put in place. It is naturally smaller than the opening, so it is bricked up all around; the side walls of the air port and the roof are put in place, the reinforcing completing the change. It takes from five to seven hours and the cost of two ports is about 1700 marks. At Julienhuette it lasts for 300 heats. With the ordinary furnace construction a roof lasted from 420 to 450 heats of 33 tons weight. The first 40-ton furnace of the new construction made 554 heats with one roof. It was slightly repaired and 325 more heats were made, so that from one shutdown to the other 879 heats and 34,200 tons of steel were made. A second furnace made 620 heats, the roof was repaired and it is still working. This construction has also increased the daily output considerably and is being introduced at Bethlen Falva.

The ratio of length of hearth to width varies, but in the large European furnaces is from 2.5:1 to 2.7:1. The extreme width is 12½ ft., which still allows ready repair of the back wall, and 34 ft. is the length. At Julienhuette the bath is maintained with 18½ in. depth to allow quick reaction of the slag and the metal. The roof is supported on columns and is made independent of the front and back walls. Cast plates are being used more and more to reinforce the furnace, openings being left through which to make repairs. An illustration of front and back walls is shown in Fig. 6.

The above improvements are designed to make the

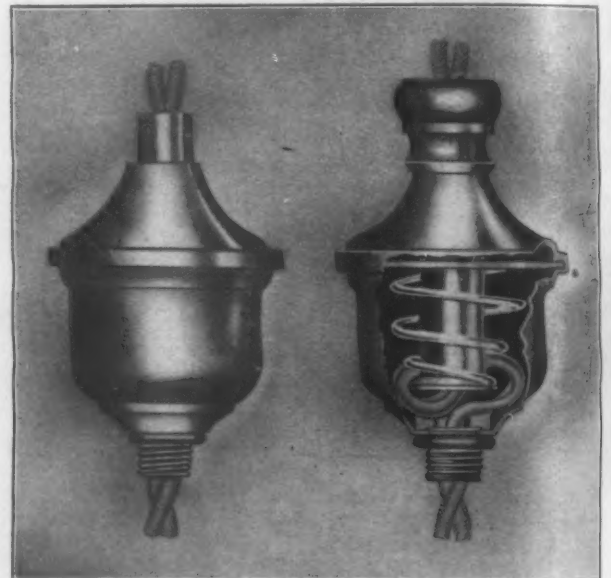
open hearth process more reliable and capable of attaining the economies of the Bessemer process.

G. B. W.

### The Tungstelet Shock Absorber for Tungsten Lamps

The installation of tungsten lamps in factories, stores and other places where they are subjected to considerable vibration has been limited in the past because of their fragility. To neutralize these vibrations, a number of shock absorbers have been recently brought out. One of the latest and most ingenious of these is the Tungstelet, manufactured by the Tungstelet Company, 101 Walker street, New York City, which is illustrated herewith.

As will be noticed this device is arranged so that the weight of the socket and shade is balanced against the compression of a spring, and any vibration or jar reaching the plunger to which the spring is attached is absorbed by it. This device is compact and provision



A Shock Absorber for the Suspension of Tungsten Filament Incandescent Lamps, Made by the Tungstelet Company, New York.

is made against breakage of the spring by having a flange on the plunger, and space is allowed for surplus wire, which removes any possibility of strain on the wire and allows the Tungstelet to perform its function. It can be furnished in any one of the standard finishes for fixtures, so that it is in harmony with whatever fixture it may be used with.

To prove the efficiency of the device the Tungstelet has been tested on a vibrating machine consisting of a motor to which the fixture stem is connected by an eccentric and caused to vibrate at a high rate of speed. A metallic filament lamp is attached to the stem, and when the motor is started is subjected to vibration, which is said to be far more severe than is ever possible in actual service even under the most trying conditions. In these tests the lamp was not affected by the vibrations, as they were absorbed by the Tungstelet.

One model H-8 engine drew a train of loaded coal cars, over a mile and a quarter in length, over the middle division of the Pennsylvania Railroad between Altoona and Harrisburg August 18. The train was made up of 120 steel cars, all of 100,000-lb. capacity. Telephonic communication was established between the engine and caboose of the train, and the engineer was directed by the officials from the rear end of the train. An average speed of more than 20 miles an hour was maintained over the division.



## The Sauer Adjustable Shaft Bearing

Compensation for Wear Is Made by a Set of Bearing Blocks

A new type of adjustable shaft bearing which provides means for compensating for wear and insuring a proper alignment of the shaft by using a set of bearing members or blocks adjustable in a radial direction has been placed on the market by the Sauer Power Generating Company, 5115 Rosetta street, Pittsburgh, Pa. This bearing is of standard form, and is said to be especially adapted for all high speed machinery where accurate running is required. The special advantages claimed for it are simplicity of construction, easy adjustment of center and side motions while running and the elimination of liners, oiling grooves and shaving or fitting. Fig. 1 is a view of the bearing ready to be placed on the shaft, Fig. 2 is a section through the bearing showing it in place, while Fig. 3 is the threaded collar or thimble and Fig. 4 the tapered sleeve for adjusting the fit.

The bearing consists of a casing or shell suitably supported and a sleeve having several slots fits loosely around the shaft. The bearing blocks are inserted in these slots, as shown in Fig. 4, to slide freely therein and be adjustable relative to the shaft. At one end of

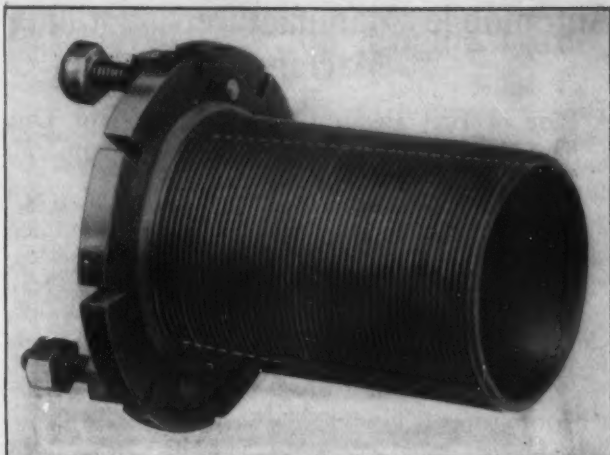


Fig. 3.—The Thimble.—The Dotted Lines Show the Bore for the Taper Sleeve.

agement with the shaft and to compensate for wear. To turn the thimble more conveniently an annular flange B is provided at its outer end, which enables the thimble to be engaged with a spanner or wrench.

The threaded ring A set on the thimble can be used to screw up against the end of the shell after the thimble has been adjusted as a lock nut to prevent displace-

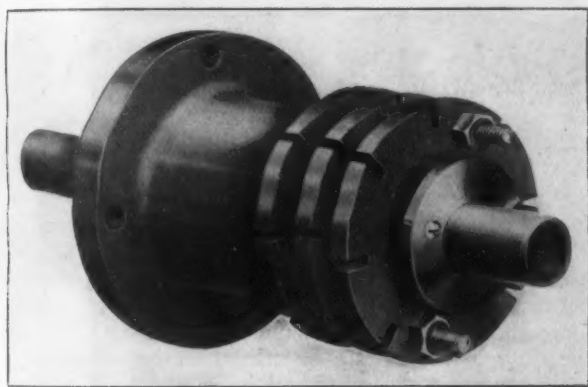


Fig. 1.—The Adjustable Shaft Bearing, Manufactured by the Sauer Power Generating Company, Pittsburgh, Pa.

the shell a thimble is placed between it and the bearing block and the engaging surfaces between these three parts are so arranged that the distance between the blocks and the shaft is regulated by the position of the thimble. The preferred construction is to make the bearing blocks wedge shaped with their outer faces at an angle to the axis of the shaft, rounded and tapering toward the end of the shell engaging the thimble. The bore of the thimble, which is indicated by the dotted lines in Fig. 3, is tapered to correspond to the outer faces of the bearing blocks. This thimble is threaded externally, and the bearing shell internally so that the threads engage, and by rotating the former the bearing blocks are adjusted accurately to insure a proper en-

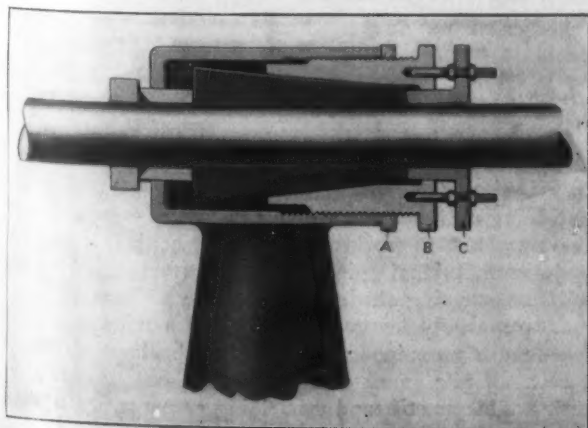


Fig. 2.—Sectional View, Showing the Bearing in Place.

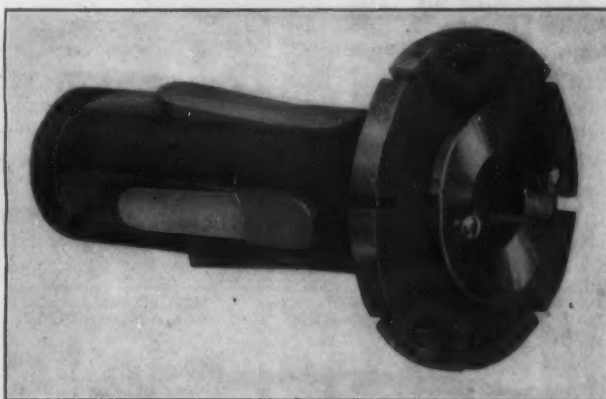


Fig. 4.—The Taper Sleeve with the Bearing Blocks in Place.

ment. Another means provided for locking the thimble consists of the annular flange C on the end of the sleeve surrounding the shaft through which a number of bolts pass. These bear against the flange B on the end of the thimble and are held in place by nuts on each side of the flange, which serve to force the bolts against it and lock them in place.

At the opposite end of the shell there is an annular flange extending inwardly and fitting on the sleeve surrounding the shaft. The space inclosed by this flange is utilized for storing oil to lubricate the bearing, and this may be fed into the chamber from a tank through a pipe tapped in the shell of the bearing. The oil passes from this space to the shaft through apertures in the portions of the sleeve between the bearing blocks, which are clearly shown in Fig. 4. Drippings of the lubricating oil may be drawn off from the bottom of the shell by another pipe and fed back into the tank by a pump or other device of this nature.

In use the center adjustment is secured by loosening the lock nut A and turning the inside tapered sleeve or thimble in Fig. 3 as the running fit requires. To adjust the side motion the nuts on the flange of the sleeve C are tightened. The only wearing parts of the bearing are the adjustable blocks shown in Fig. 4, which are made either of babbitt metal or bronze. As side friction on the bearing wears only one block at a time, it is possible by turning the sleeve to have all the blocks successively assume the position of greatest wear and wear them all down equally. New blocks can be easily set in position when the old ones wear out, as no special skill is required.

## Automobile Manufacturers' Drilling Machines

### A Line of Ball Bearing Machines Brought Out by the Henry & Wright Mfg. Company

The automobile manufacturers' drilling machine is the name given to a new type which has been brought out by the Henry & Wright Mfg. Company, 111 Sheldon street, Hartford, Conn. This line contains all the features which distinguish the company's smaller machines, and in addition some new ideas which add much to the usefulness of the machines for their particular work. The special field which these machines are intended to cover is handling the variety of work necessary in the manufacture of automobiles and other allied lines. The two initial sizes of the full line are the Nos. 1 and 6 machines, illustrated herewith in Figs. 1 and 2, respectively. The company's experience during three years' experimenting with these machines has shown that as they embody the principles of high speed and frictionless bearings, they are capable of a much wider range of work than was permitted by the proportions of what had formerly been considered standard practice. The limit of the plain bearing drill press was a  $\frac{3}{8}$ -in. drill, and the high speed ball bearing machine permitted an increased range of holes up to  $\frac{3}{4}$  in. without straining the frame. It was also demonstrated that in this type the belt was capable of conveying power to the spindle much in excess of the limits of the construction. The desirability of greater rigidity and correspondingly increased range were apparent to users of these machines, and their demands have led to the design of the new type which has a capacity in commercial usage of  $1\frac{1}{8}$ -in. drills.

These new machines are much heavier and more rigid than the older models, are fully equipped with

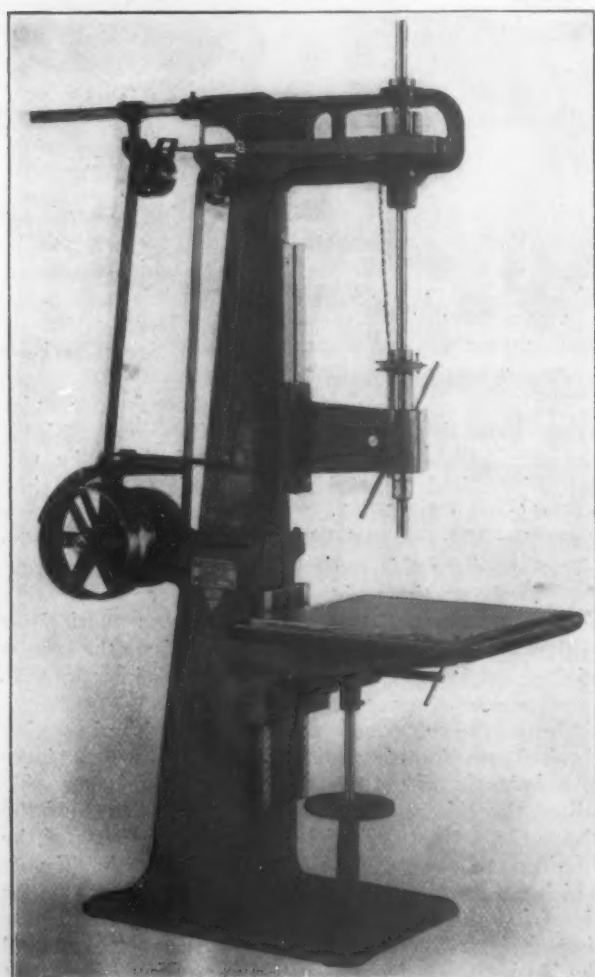


Fig. 1.—The No. 1 Ball Bearing Sensitive Drill Press, Made by the Henry & Wright Mfg. Company, Hartford, Conn.

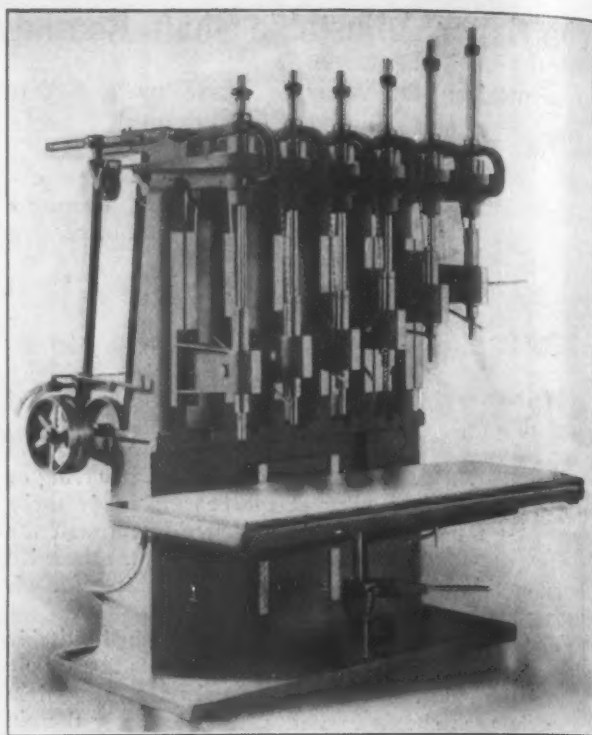


Fig. 2.—The No. 6 Ball Bearing Drilling Machine for Automobile Builders.

ball bearings and have sufficient power to drive high speed drills up to as large as  $1\frac{1}{8}$  in. The ball bearings are made interchangeable and can be renewed at small expense when required, thus prolonging the life of the machines indefinitely. The principles of the type are embodied in the No. 1 machine. There are various new features, among which is the location of the new spindle pulley drive beneath the frame at the top instead of above it, a departure from accepted design which permits a shorter and stiffer spindle. The spindle pulley bracket is braced supporting the spindle at both the top and the bottom instead of at the bottom only, which serves to increase rigidity. The drive employs a pair of hardened round bars instead of blocks. The method of attaching the spindle arm secures increased service and accuracy and consists of a screw at the top and the bottom of the spindle arm connection, working in conjunction with a key in a groove along the pillar. The details of this connection are clearly given in Fig. 1. The spindle sleeve has an inserted steel rack and the pinion which meshes with it is also much larger, longer and heavier. Adjustable stops are furnished to fit either the spindle at the top of the pulley or the rack. This adds to the convenience of operation and does away with the chance of straining the upper arm when the stop is forced down against it, as the operator exerts the strength requisite for the drive for which the machine is intended. For accurate drilling or counterboring to a specified depth the builder recommends using the stop for the rack sleeve.

A special type of new balanced idler pulley is used, together with a bracket which incloses the belt and prevents it from slipping when adjustments are being made. The machines are entirely belt driven and are made with from one to six spindles and in three sizes, for drilling to the centers of 16, 24 and 30 in. circles. The spindle is driven by an endless belt  $1\frac{3}{4}$  in. wide and the rear shaft by a  $2\frac{1}{2}$ -in. belt, the wider one being designed to furnish sufficient power to enable two operators to work on the same machine, if desired, and the individual spindles may be started or stopped without stopping the entire machine. The tables are made especially heavy and with extra wide and long ways and are equipped with a hand wheel and elevating screw. While every precaution has been used to furnish a table as stiff and unyielding as necessary to drill the heavy work designed to be handled, additional sup-



port is furnished by two supporting jacks at the outer corners of the tables. Extra wide and deep oil grooves are provided around the tables, and, if desired, both ends may be connected by tubing with an oil tank inside the base. A rim is cast around the foot of the latter to prevent oil from flowing from the machine to the floor.

The No. 6 model embodies the various features of the No. 1 machine and also has a box base of exceptionally massive proportions. In this machine the adjustment of the table, which weighs 1100 lb., is accomplished by a ratchet device instead of the usual hand wheel to furnish greater leverage in raising it and to add to the convenience of the operator. The following

## The Willard 13-In. Engine Lathe

The Willard Machine & Tool Company, Cincinnati, Ohio, is placing on the market a 13-in. engine lathe equipped with double back gears and a three-step cone pulley, which is illustrated herewith. As will be noticed, the tool is symmetrical and attractive in outline and it is claimed that it is built to withstand any strains that may be imposed upon it by the use of high speed steel tools.

All parts are manufactured to standard jigs and gauges and are practically interchangeable. The lead screws and feed rods are of special high grade carbon

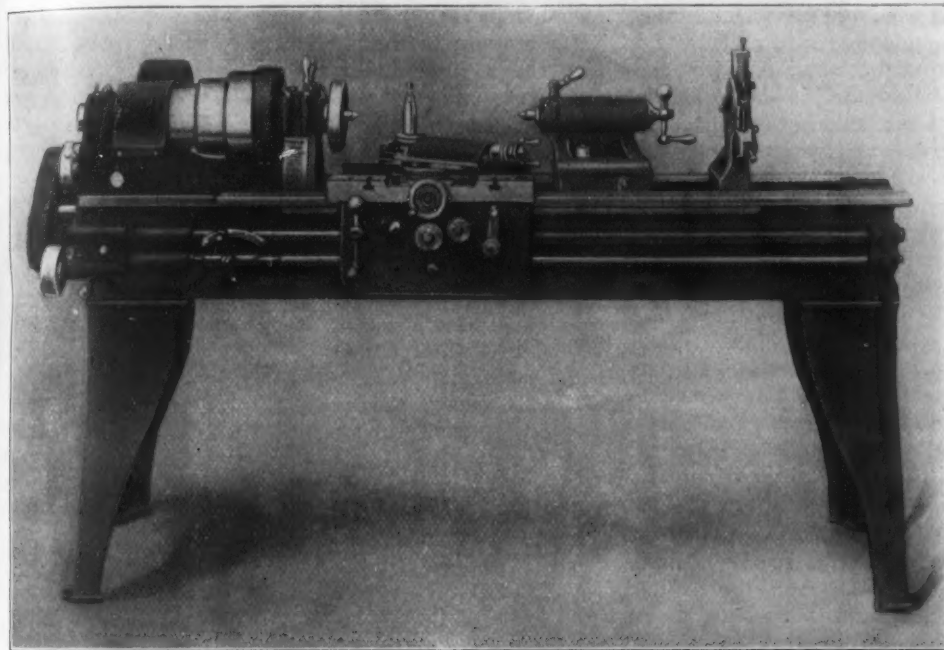
steel. All sliding surfaces are scraped to a bearing and the spindle and all cylindrical parts are ground to insure accuracy. The belt feed is  $1\frac{1}{2}$  in. wide and runs on large pulleys of equal diameter, giving an extremely powerful feed. The usual belt tightener is provided, and four changes of feed are obtained by simply moving a level to any one of four locations.

This lathe is equipped with plain or compound rest, follow and steady rest, change gears, large and small face plates, double friction countershaft and wrenches. The head-

stock has a bearing of  $21\frac{1}{2}$  in. on the bed, the spindle is 0.60 per cent. carbon crucible spindle steel and the front journal is  $2\frac{3}{8}$  in. in diameter and 4 in. long. The spindle is designed to hold a bushing bored for a No. 3 Morse taper. The bearings are high grade phosphor bronze and the gears are steel; the idlers are bushed with phosphor bronze. The tailstock is well proportioned and very rigid. The carriage has a bearing 18 in. long on the V-ways. The compound rest is unusually large, making it very rigid, and its design and construction are claimed to be new. All gears are entirely covered. The apron, including bearings in it, is cast in one piece, making it very stiff and strong. A safety device prevents throwing in the half nuts when either feed is connected, thus preventing breakage.

### The Menne Oxygen Melting Process.—F. H. Kindl.

413 Bakewell Building, Pittsburgh, representative in the United States of the Menne oxygen melting process, has closed a contract with the Stewart Iron Company, Sharon, Pa., for a license to use the process; also with the Shenango Furnace Company, for its three furnaces at Sharpsville, Pa. The equipment included in contracts for the use of the Menne process does not take in the tanks with oxygen and coal gas. These are furnished by the Linde Air Products Company, Buffalo, N. Y. Where the tanks are owned by the furnace company the cost of oxygen and coal gas is about 2 cents per cubic foot, or considerably less than when this process was first demonstrated in the United States. Experience has shown that two tanks of oxygen and one of coal gas will open an ordinary frozen tap hole, cinder notch or tuyere in a few minutes. Two men are required to operate the apparatus.



The 13-In. Engine Lathe with Double Back Gears, Built by the Willard Machine & Tool Company, Cincinnati, Ohio.

table gives the principal dimensions and specifications of this size of machine:

|  |         |
|--|---------|
| Height over all, feet.....                             | 8½      |
| Height of base from floor, inches.....                 | 36      |
| Distance between spindle centers, inches.....          | 10¼     |
| Maximum distance between spindle and table, inches.... | 30      |
| Diameter of spindles, inches.....                      | 1½      |
| Dimensions of table, inches.....                       | 75 x 24 |
| Floor space required, inches.....                      | 81 x 62 |
| Size of belt for spindles, inches.....                 | 1¾      |
| Driving belt for rear shaft, inches.....               | 2½      |
| Weight of table, pounds.....                           | 1,100   |
| Net weight of complete machine, pounds.....            | 5,500   |

The series of tests which resulted in the design of these new machines were carried on in conjunction with one of the largest users of the company's product. The required limit of accuracy of the perpendicularity of the spindles is 0.002 in. in an 8-in. circle.

The Invincible Electric Bank Protection Company, Monroe, Wis., manufacturer of electric burglar alarm systems, steel filing cases, safe deposit boxes, steel desks and safe cabinets, was, on August 16, awarded the contract, amounting to \$3269.75, for the steel desks to be installed in the assembly chamber of the new State capitol, Madison, Wis. The company has recently opened a branch agency in New York City, in charge of Philip Abrahams and Francis Koref, with offices at 29-31 Liberty street.

The Lake Superior Iron & Chemical Company, Detroit, Mich., has made an appropriation of \$1,000,000 for the rebuilding of its chemical plants at Ashland, Elk Rapids, Newberry, Manistique and Chocoma. Details of the work to be undertaken have not yet been determined upon.

## Silicon Steel

### Results of Tests Made Show Its Superiority Over Other Kinds

BY G. A. BISSET, NAVAL CONSTRUCTOR, U. S. N., MUNHALL, PA.

The value of silicon as a content of steel lies in the fact that by adding it to low carbon steel it is possible to obtain steel with a tensile strength as high as that obtained in high carbon steel, while the other valuable characteristics of a low carbon steel are maintained, *i. e.*, ductility, reduction of area and impact resistance. While there is perhaps a slight loss in the ductility in the case of silicon steel from that obtained with a low carbon steel, the reduction of area and impact resistance are higher. The question as to whether or not impact resistance is less important than elongation or ductility is believed to be open to argument, especially where the steel is to be used for shipbuilding purposes. The curves shown in Fig. 1 illustrate the superiority of the silicon steel over the high carbon steel, the shaded area in each representing the total superiority. In each case the most marked difference is in the impact resistance. The base line in each curve represents ordinary medium steel of 0.20 per cent. carbon. The superiority of the silicon steel to the ordinary medium steel is represented by the algebraic sum of the areas of the curves above and below the base line. Although the difference in favor of the superiority of high carbon over medium steel is inappreciable, silicon steel shows a very marked superiority.

Figs. 2, 3 and 4 illustrate tests to destruction of flasks for compressed air made of low carbon, high silicon and vanadium-chrome-nickel and vanadium-chrome steels, respectively. The low carbon steel analysis was silicon, 0.192; sulphur, 0.016; phosphorus, 0.015; manganese, 0.50, and carbon, 0.23 per cent. The flasks had an external diameter of  $7\frac{1}{8}$  in. and a  $\frac{3}{8}$ -in. wall. The length was 43 in. and the average weight 108½ lb. The physical tests of the flasks showed an elastic limit of 36,000 lb. per square inch and a tensile strength of 65,000 lb. The elongation in an 8-in. specimen was 27 per cent., accompanied by a reduction in area of 50 per cent. The results of the pressure tests are given in the following table:

| Flask No. | Yield point at pressure. |                                       | Corresponding elastic limit of material. | Corresponding tensile strength of material. | Remarks.  |
|-----------|--------------------------|---------------------------------------|--|---|---|
|           | Pounds per sq. in.       | Burst at pressure. Pounds per sq. in. | Pounds per sq. in.                       | Pounds per sq. in.                          |   |
| 1.....    | 3,500                    | 6,600                                 | 32,000                                   | 60,400                                      | Annealed to 1590 deg. F. and reannealed to 1800 deg. F. |
| 2.....    | 3,600                    | 6,550                                 | 33,000                                   | 60,000                                      | Annealed to 1590 deg. F. and reannealed to 1800 deg. F. |
| 3.....    | 3,400                    | 7,000                                 | 31,200                                   | 64,000                                      | Do.   |
| 4.....    | ...                      | 6,900                                 | ...                                      | 63,600                                      | Annealed to 1590 deg. F.                                |
| 5.....    | 3,600                    | 6,700                                 | 33,000                                   | 61,600                                      | Do.   |
| 6.....    | 3,600                    | 6,600                                 | 33,000                                   | 60,400                                      | Do.   |
| 7.....    | 3,600                    | 6,800                                 | 33,000                                   | 62,400                                      | Do.   |
| 8.....    | 3,600                    | 6,600                                 | 33,000                                   | 60,400                                      | Do.   |
| 9.....    | ...                      | 6,600                                 | ...                                      | 60,400                                      | Do.   |
| 10.....   | ...                      | 6,850                                 | ...                                      | 62,800                                      | Do.   |

The silicon steel on analysis showed carbon, 0.39; phosphorus, 0.035; manganese, 0.95; sulphur, 0.026, and silicon, 0.98 per cent. The flasks were  $8\frac{1}{2}$  in. external diameter,  $\frac{1}{4}$  in. wall thickness and 51 in. long. 100,460 lb. per square inch, respectively, while the elongation in an 8-in. piece was 12.1 per cent., accompanied by a reduction in area of 37.1 per cent. The

nickel-chrome-vanadium steel had a composition of carbon, 0.32; phosphorus, 0.012; manganese, 0.32; sulphur, 0.017; nickel, 3.3; chrome, 1.60, and vanadium, 0.19 per cent. These flasks had the same length and wall thickness as the others shown in Fig. 3, but the outside diameter was  $\frac{1}{8}$  in. greater. The physical tests before annealing showed an elastic limit and a tensile strength of 66,640 and 114,600 lb. per square inch, as the valves of the elastic limit and the tensile strength of the material. The elongation in 2 in. was 20 per cent. and the reduction in area 59 per cent. The results of the pressure tests are given below:

| Flask No. | Yield point at pressure. |                                       | Corresponding elastic limit of material. | Corresponding tensile strength of material. | Remarks.          |
|-----------|--------------------------|---------------------------------------|--|---|-------------------|
|           | Pounds per sq. in.       | Burst at pressure. Pounds per sq. in. | Pounds per sq. in.                       | Pounds per sq. in.                          |                   |
| 38.....   | 3,800                    | 5,700                                 | 60,800                                   | 91,000                                      | After annealing.  |
| 48.....   | 4,000                    | ....                                  | 64,000                                   | .....                                       | Before annealing. |
| 48.....   | 3,600                    | 5,800                                 | 57,600                                   | 92,800                                      | After annealing.  |
| 1VCN..... | ....                     | 6,600                                 | .....                                    | 107,000                                     | After annealing.  |
| 3VCN..... | ....                     | 6,350                                 | .....                                    | 103,000                                     | After annealing.  |

The chrome-vanadium steel had a composition of carbon, 0.2; phosphorus, 0.049; manganese, 0.6; silicon, 0.031; chrome, 1.05, and vanadium, 0.15 per cent. These flasks were 8 11-16 in. outside diameter with a  $\frac{1}{4}$ -in. wall, were 51 in. long and weighed an average of 105 lb. The physical tests showed an elastic limit ranging from 63,500 to 68,800 lb. per square inch and a tensile strength of from 84,000 to 93,000 lb. The elongation in 8 in. varied in different specimens from 8.25 to 16.5 per cent. and the reduction in area was between 41.8 and 50.4 per cent. The results of the tests follow:

| Flask No. | Yield point at pressure. |                                       | Corresponding elastic limit of material. | Corresponding tensile strength of material. | Remarks.               |
|-----------|--------------------------|---------------------------------------|--|---|------------------------|
|           | Pounds per sq. in.       | Burst at pressure. Pounds per sq. in. | Pounds per sq. in.                       | Pounds per sq. in.                          |                        |
| 1V.....   | ....                     | 6,350                                 | .....                                    | 107,000                                     | Not treated.           |
| 4V.....   | 6,200                    | 6,450                                 | 105,000                                  | 109,000                                     | Treated and tempered.  |
| 5V.....   | 7,200                    | 7,700                                 | 121,000                                  | 130,000                                     | Do.                    |
| 6V.....   | 8,200                    | 8,500                                 | 138,000                                  | 143,000                                     | Do.                    |
| 9V.....   | 7,200                    | 7,500                                 | 121,000                                  | 126,000                                     | Do.                    |
| 12V.....  | 6,400                    | 6,950                                 | 108,000                                  | 117,000                                     | Do.                    |
| 14V.....  | 7,400                    | 7,650                                 | 125,000                                  | 129,000                                     | Do.                    |
| 13V.....  | 3,300                    | 5,400                                 | 55,000                                   | 91,000                                      | Treated, not tempered. |
| 15V.....  | 3,300                    | 5,000                                 | 55,000                                   | 84,000                                      | Do.                    |

Probably the most important requirement for flasks is that they should not shatter upon bursting from compressed gas pressure. Strength combined with lightness, however, is also desired. It will be noted that the flasks made of vanadium-chrome steel are vastly superior in every way. The superiority of this material over the vanadium-chrome-nickel appears on first sight unexpectedly great. The difference would probably disappear were it possible to harden and temper the latter properly. To do so it is held that the material must be sprayed, while hot, on both sides uniformly with water. This is impracticable in the case of flasks, though perfectly simple with special treatment steel protective deck plates of almost identical



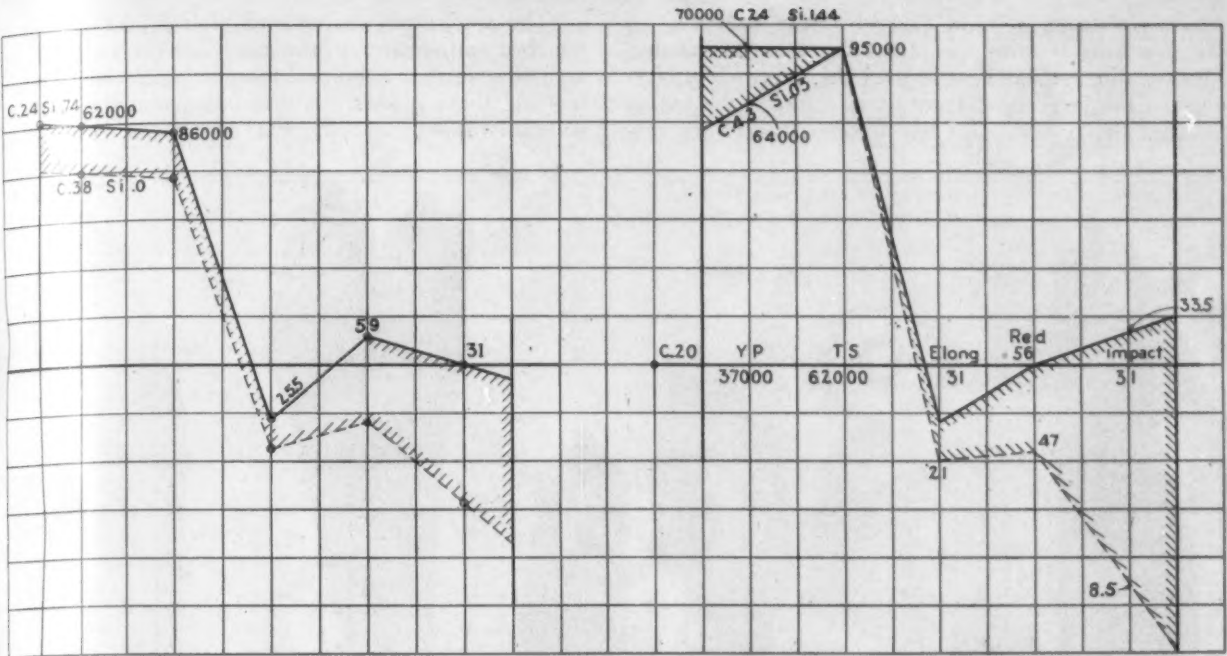


FIG. 1.—Curve Showing the Superiority of Silicon Steel Over High Carbon Steel.

composition. The vanadium-chrome-nickel steel is also difficult to work while hot, being very tough and hot short. The flasks of this material wrinkled and cracked badly at the neck in swaging down. It is believed that non-shattering flasks could be made from high silicon steel containing a carbon content of 0.20 to 0.24 per cent., the material having a tensile strength of about 80,000 lb. per square inch. A carbon content of 0.39 per cent., as in the flasks tested, is entirely too high for good elongation.

It is believed that the extension of the use of silicon steel for shipbuilding will mark an era in that industry. As its strength is about one-third greater than medium steel, its use in place of medium steel for the hull of a ship would result in a saving of 25 per cent. of the weight. Although its cost is now \$20 per ton greater than medium steel, the cost of the hull of a vessel, whether built of silicon steel or medium steel, is practically the same, being only 12 per cent. greater in the case of silicon steel. For example, the hull of a vessel built of medium steel weighs 6000 tons, but as the tensile strength of medium steel is about 60,000 lb. per square inch, and silicon 80,000, the weight of a similar hull of equal strength made of silicon steel would be only 4500 tons.

There seems to be no adequate reason for the steel manufacturers charging this extra price for silicon steel. The actual reason is that silicon steel is used only by the Government, and in case of rejection this steel has to be cut into scrap and remelted, whereas the

medium steel rejected for Government use is sold to the trade with very little loss in the shape of scrap. There is also a difficulty now encountered which will probably disappear with experience in the manufacture of silicon steel, as the slabs have scabs and tears on the surface which, unless chipped or ground out, will appear as snakes on the plate. These tears seem to be caused by the ingots being hot short. While the chipping out of the tears in itself does not require much labor, it is necessary to permit the slab to cool down before this work is undertaken, thus causing considerable loss and waste of time, as ordinarily the slabs are never allowed to lose their heat before rolling into plates. No tears occur in rolling the slabs into plates; hence the conclusion is that the ingots are not rolled into slabs at the right temperature. Little difficulty is experienced with silicon steel in England, where acid open hearth furnaces are used, instead of the basic, which are used almost exclusively in this country.

Plates, shapes and rivet rounds made of silicon steel were tested at the New York Navy Yard in 1909. The tests included rolling, punching, shearing and flanging, both hot and cold, and working to shapes, such as boss plates; for the shapes, punching, shearing and smithing to joggles, the effect of working heats being noted. The rivet rounds were used partly for the manufacture of rivets which were tested for shearing strength after having been driven up in such a manner on hull plating as to insure double shearing. Tests were made of the high tensile plates, both galvanized and black, the gal-

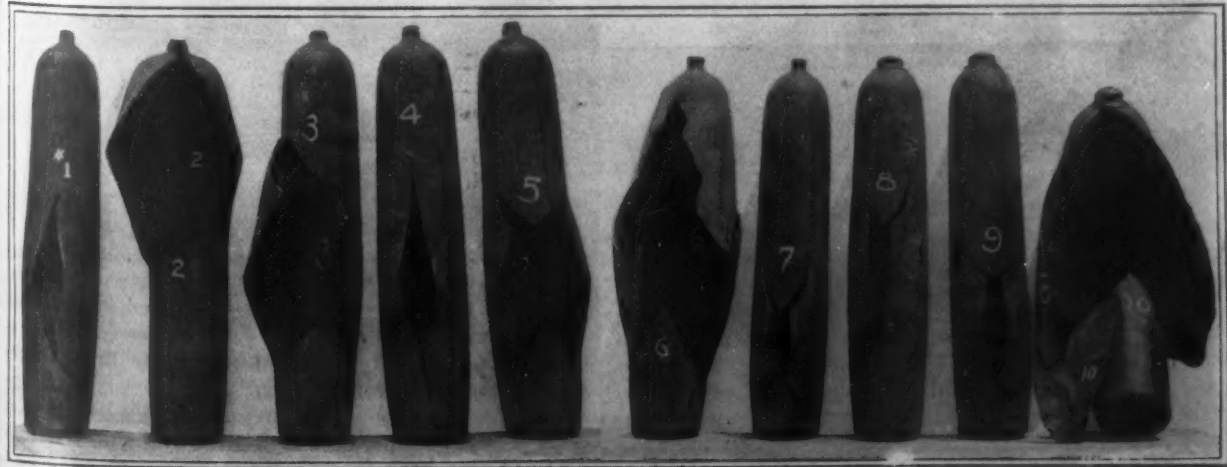


Fig. 2.—Low Carbon Steel Air Flasks Tested to Destruction.

vanized showing a slight gain in tensile strength. In the punching tests of the plates the material punched cleanly, did not build up around the lower circumference of the hole and did not break through the spaces between the rivet holes. The shearing test of the ma-

The angles and channels of high silicon steel were punched and sheared in the same manner as the plates and were further subjected to splitting, welding, bending and jobbing tests. It was found that the material welded without difficulty, but was tough in bending.

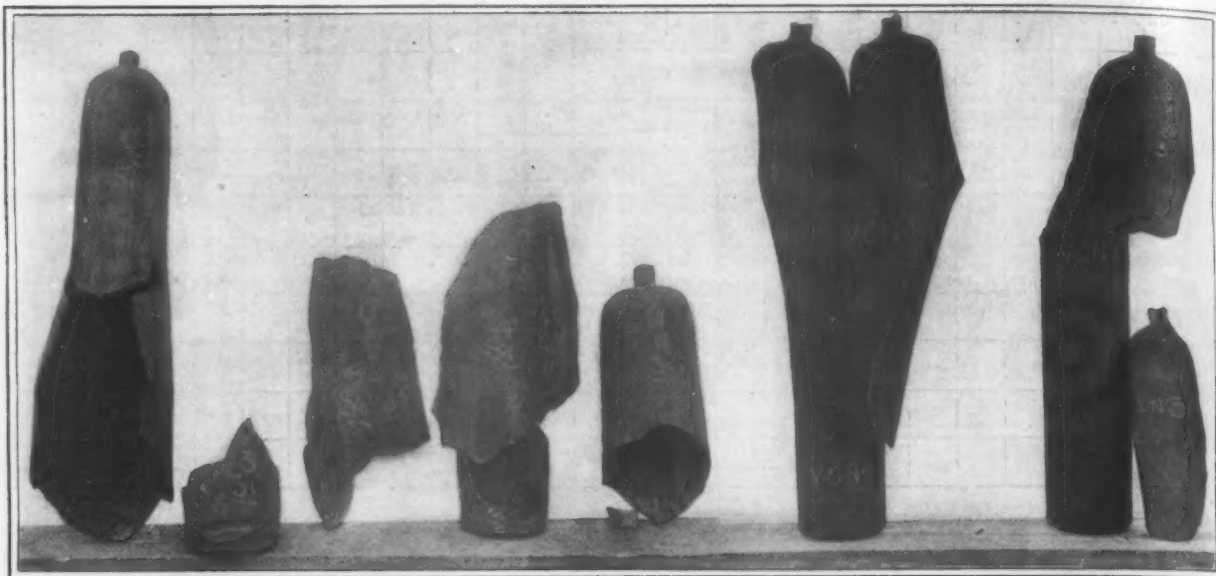


Fig. 3.—Results of Destruction Tests of Silicon and Vanadium-Chrome-Nickel Steel Air Flasks.

terial was satisfactory, no perceptible difference being noted between the high silicon steel and regular medium steel. Some immaterial difference due to the difference in tensile strength of the two materials was assumed to exist, but this could not be verified by the means at hand.

On the rolling test the 10, 15 and 20 lb. plates, when rolled to a diameter of 20 in., showed no cracks or flaws on the outer circumference of the strips tested. The

In general the smithing test gave favorable results in every case.

Tests of the rivets resulted as follows:

| Size.<br>Inch. | Yield<br>point. | Tensile<br>strength. | Reduction<br>in area.<br>Per cent. | Shearing<br>strength per<br>square inch. |
|----------------|-----------------|----------------------|------------------------------------|--|
| ¾.....         | 52,500          | 79,500               | 63.75                              | 74,000                                   |
| ⅝.....         | 54,000          | 77,000               | 62.5                               | 70,000                                   |

The New York Navy Yard reported as a result of all tests made on high silicon steel that the conclusions

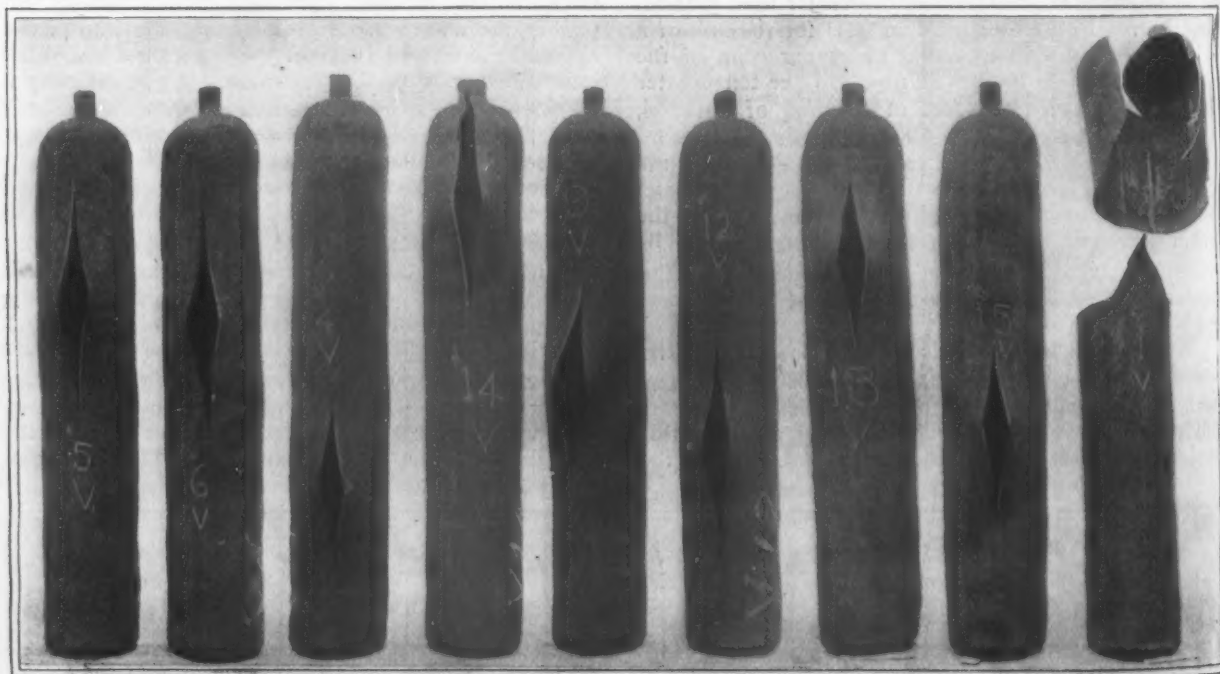


Fig. 4.—Destruction Tests of Chrome Steel Vanadium Air Flasks.

40-lb. plates, however, when rolled to a diameter of 30 in. cracked across the strip in several places.

The results obtained on the hot and cold bending tests were considered very satisfactory, and compared most favorably with similar results obtained on hot and cold bending tests of mild steel plates. A portion of each high silicon steel plate was made up into a boss plate, and each boss plate was flanged hot on the end. Satisfactory results were obtained in every case, the material working without difficulty.

derived were favorable to the use of the material for structural work in the manufacturing department at the yard. In the case of the tests conducted at the New York Navy Yard, the carbon content was in every instance higher than is recommended for high silicon steel. From the result of tests conducted at Carnegie Steel Company's works it was found that the carbon content should not exceed 0.28 per cent., while 0.23 and 0.24 per cent. gave the best results. In tests conducted at the navy yard the carbon content ran as high as



0.44 per cent., or sufficient to cause great brittleness. The following are the results of some tests of different steels made at the Homestead plant of the Carnegie Steel Company:

| Object, rods. | Yield point. | Tensile strength. | Percentage of elongation in 8 in. | Percentage of reduction in area. | Bends. | Double shearing strength per sq. in. | Percentage of tens. strength. |
|---------------|--------------|-------------------|-----------------------------------|----------------------------------|--------|--------------------------------------|-------------------------------|
| Inch. Number. |              |                   |                                   |                                  |        |                                      |                               |
| 540           | 48,840       | 76,730            | 29.25                             | 59.8                             | Flat.  | 99,740                               | 65                            |
| 541           | 52,740       | 82,690            | 26.25                             | 55.1                             | Flat.  | 109,500                              | 66                            |
| 542           | 58,020       | 87,970            | 25.00                             | 50.3                             | Flat.  | 113,300                              | 64                            |
| 543           | 49,010       | 77,420            | 28.25                             | 53.5                             | Flat.  | 105,800                              | 68                            |
| 544           | 69,660       | 119,280           | 7.25                              | 9.6                              |        | 152,200                              | 64                            |
| 545           | 48,500       | 75,720            | 26.25                             | 49.0                             | Flat.  | Shackles broke.                      |                               |

| Object, rods. | Yield point. | Tensile strength. | Percentage of elongation in 8 in. | Percentage of reduction in area. | Bends. | Double shearing strength per sq. in. | Percentage of tens. strength. |
|---------------|--------------|-------------------|-----------------------------------|----------------------------------|--------|--------------------------------------|-------------------------------|
| Inch. Number. |              |                   |                                   |                                  |        |                                      |                               |
| 540           | 61,710       | 82,280            | 28.0                              | 4                                | 62.0   | 34.08                                |                               |
| 541           | 62,380       | 86,390            | 25.5                              | 4                                | 59.1   | 30.58                                |                               |
| 542           | 70,340       | 94,900            | 25.0                              | 4                                | 56.2   | 33.5                                 |                               |
| 12,282        | 65,030       | 90,910            | 21.5                              | 4                                | 56.2   | 28.16                                |                               |
| 41,117        | 57,060       | 80,960            | 22.5                              | 4                                | 49.9   | 18.5                                 |                               |
| 46,582        | 63,820       | 95,050            | 21.0                              | 4                                | 47.1   | 8.5                                  |                               |
| 540           | 65,950       | 87,340            | 30.0                              | 3                                | 61.4   | 36.12                                |                               |
| 541           | 68,100       | 91,400            | 28.0                              | 3                                | 56.0   | 33.1                                 |                               |
| 542           | 82,430       | 98,560            | 28.0                              | 3                                | 56.0   | 32.72                                |                               |
| 6             | 51,030       | 67,570            | 32.66                             | 3                                | 67.3   | 35.87                                |                               |
| 8             | 58,300       | 81,240            | 26.66                             | 3                                | 49.3   | 14.4                                 |                               |
| 7             | 66,910       | 108,000           | 20.0                              | 3                                | 41.2   | 6.02                                 |                               |

| Object, plates. | Heat.  | Number.  | Yield point. | Tensile strength. | Percentage of elongation in 8 in. | Percentage of reduction in area. | Bends.      | Average impact. |
|-----------------|--------|----------|--------------|-------------------|-----------------------------------|----------------------------------|-------------|-----------------|
| 1/2-in. ....    | 18,078 | 37,593-L | 46,680       | *80,700           | *24.0                             | 52.5                             | T. C. Flat. | L. 35.0         |
|                 |        | 37,593-T | 43,480       | *79,670           | *24.75                            | 50.9                             | L. C. Flat. | T. 30.0         |
|                 |        | 37,593-L | 44,650       | *79,610           | *25.0                             | 56.0                             | L. C. Flat. | ...             |
|                 |        | 37,593-T | 43,610       | *78,580           | *25.25                            | 50.5                             | T. C. Flat. | ...             |
| 1-in. ....      | 18,078 | 37,594-L | 42,840       | 81,070            | *23.75                            | 43.5                             | L. C. Flat. | L. 25.0         |
|                 |        | 37,594-T | 43,730       | 79,680            | *23.75                            | 42.0                             | L. C. Flat. | T. 25.3         |
|                 |        | 37,594-L | 43,660       | 79,800            | 26.0                              | 40.8                             | T. Q. Flat. | ...             |
|                 |        | 37,594-T | 42,000       | 78,300            | 23.75                             | 33.9                             | T. Q. Flat. | ...             |
| 1/2-in. ....    | 5,137  | L        | 36,950       | 61,820            | 30.75                             | 56.5                             | .....       | L. 30.66        |
|                 |        | T        | 36,960       | 61,740            | 32.0                              | 54.1                             | .....       | T. 26.66        |
| 1-in. ....      | 46,115 | L        | 35,350       | 61,740            | 31.25                             | 54.2                             | .....       | L. 24.3         |
|                 |        | T        | 35,260       | 61,740            | 33.0                              | 50.6                             | .....       | T. 23.3         |

\* Broke within 2 in. of end measuring points.

| Number.     | Carbon. | Phosphorus. | Manganese. | Sulphur. | Silicon. | Nickel. |
|-------------|---------|-------------|------------|----------|----------|---------|
| 540.....    | 0.22    | 0.012       | 0.39       | 0.020    | 0.83     | ...     |
| 541.....    | 0.24    | 0.015       | 0.46       | 0.021    | 0.74     | ...     |
| 542.....    | 0.24    | 0.030       | 0.49       | 0.022    | 1.44     | ...     |
| 543.....    | 0.22    | 0.026       | 0.42       | 0.024    | 0.90     | ...     |
| 544.....    | 0.58    | 0.030       | 0.46       | 0.028    | 1.09     | ...     |
| 545.....    | 0.20    | 0.020       | 0.39       | 0.025    | 1.05     | ...     |
| 12,282..... | 0.28    | 0.008       | 0.73       | 0.016    | 0.029    | 3.40    |
| 41,117..... | 0.38    | 0.020       | 0.64       | 0.034    | ...      | ...     |
| 46,582..... | 0.43    | 0.064       | 0.47       | 0.027    | 0.031    | ...     |
| 6.....      | 0.18    | .....       | .....      | .....    | .....    | .....   |
| 8.....      | 0.38    | 0.007       | 0.47       | 0.020    | .....    | .....   |
| 7.....      | 0.53    | 0.042       | 0.47       | 0.031    | .....    | .....   |
| 18,078..... | 0.23    | 0.022       | 0.52       | 0.025    | 0.96     | .....   |
| 5,137.....  | 0.20    | 0.012       | 0.57       | 0.022    | .....    | .....   |
| 46,115..... | 0.22    | 0.008       | 0.52       | 0.017    | .....    | .....   |

The impact testing machine consisted of a pendulum which was allowed to swing from a certain fixed height and break a nicked specimen projecting radially into its path, the remaining kinetic energy being recorded on a dial and subtracted from the original kinetic energy of the pendulum, the result being the impact resistance, or, strictly speaking, the work done in breaking the specimen.

It is understood that high silicon steel was largely used in the construction of the Mauretania and Lusitania, the requirements being about as follows: Ultimate tensile strength, 74,000 to 85,000 lb. per square inch; elongation in 8 in., 18 per cent. The United States Navy requirements are: Minimum tensile strengths and elongations of 60,000 lb. and 25 per cent. and 75,000 lb. and 17 per cent. for medium steel and high tensile strength, respectively.

The steel manufacturers have found that the requirements for high tensile steel can be met much more readily by high silicon than by high carbon steel; consequently high silicon is now furnished regularly on all high tensile steel contracts. The French were, perhaps, the first to realize the value of silicon in steel. A number of years ago steel for rails in France was given a

high silicon content, as it was known that such rails stood up much better under shock.

While the tests of high silicon steels of various contents made at Homestead were instituted upon the initiation of the Bureau of Construction and Repair, Navy Department, the conclusions and opinions expressed in this article have no connection with that bureau, but merely the author's personal views.

The Seneca Chain Company's New Plant

The Seneca Chain Company has awarded the contract for the construction of its new chain and forging plant at Kent, Ohio, to the Mount Vernon Bridge Company, Mount Vernon, Ohio. The new buildings will cover an approximate area of 3 1/2 acres and will be constructed entirely of steel and iron, on concrete foundations. New and modern power appliances and operating equipment will be installed, with a view of securing the most economical production with the greatest efficiency of operation. The capacity of the new plant is to be somewhat larger than that of the old plant, destroyed by fire December 10, 1909, and with the plant at Mansfield, Ohio, will make it possible for the company to increase its output largely.

When the new plant is completed, which will probably be by November 1 to December 1, the company claims that it will make the most complete and best assorted lines of machine made and hand made chain in this country. Two new testing machines will be installed, making it possible to manufacture the largest sizes of chain in use to-day for any purpose, but especially in the line of anchor cables for large steamers, battleships, &c. A new catalogue descriptive of the entire product, which will include many new lines of forgings for railroads, &c., will shortly be issued. The company manufactures close and stud link yacht and vessel anchor cables; close and stud link marine railway haul-up and backing chains; proof, BB, BBB, steel loading, conveyor, crane, dredge, steam shovel, hoisting, sling, derrick, brake, switch, wrecking, uncoupling, lever, safety, sprocket, block, fence, wheel, trace, butt, stage, stake, harness and wagon chains, and cow ties.

The Crane Company's Fifty-fifth Anniversary.

The Valve World for July is devoted to the fifty-fifth anniversary of the Crane Company, Chicago. The anniversary was partly celebrated at Jerseyhurst, the country home of President R. T. Crane, at Lake Geneva, Wis., July 4, by a gathering of 76, comprising the managers of the several departments of the company and their wives. The managers of the branch houses presented him with a bronze group. The branch house employees gave him a silver loving cup. The directors, officers, superintendents and department heads gave him a silver service. On the following day a picnic was held at Riverview Park, near Chicago, which was attended by the thousands of employees of the company with their families. The Crane Company band, comprising 40 pieces, organized about two years ago, took a conspicuous part in the festivities.

## An Improved Absorption Dynamometer\*

### Constructional Details of a New Testing Device

BY C. M. GARLAND, URBANA, ILL.†

In testing prime movers, the engineer often laments the dearth of efficient power-absorbing apparatus. Especially is this true in the testing of small high speed machines, such as automobile engines and steam turbines. In many cases the number of machines to be tested is large; in fact, in some instances each machine is given a brake horsepower test before leaving the factory; and in every case where a high degree of reliability is essential from the output, the percentage of machines undergoing test must be large. The attention of the writer was forcibly called to this need several years ago in the testing of a small steam turbine running at 2500 rev. per min., and through this experience the type of apparatus described below was designed and has been used with satisfactory results.

In the design of such a piece of apparatus, the following points enumerated in the order of their supposed importance were to be considered: It should be free from binding or seizing; it should be free from producing changes in the load, due to changes in the apparatus itself, such as change of temperature, wear or friction of parts, &c.; it should be capable of absorbing and accurately indicating a wide range of loads, from zero to the full capacity of the machine; the regulation of the load should be positive and instantaneous; the apparatus should require a minimum amount of attention and be capable of continuous service; it should be self-contained, occupy a small amount of floor space, and be free from noise and the splashing of oil and water; it should be capable of being quickly

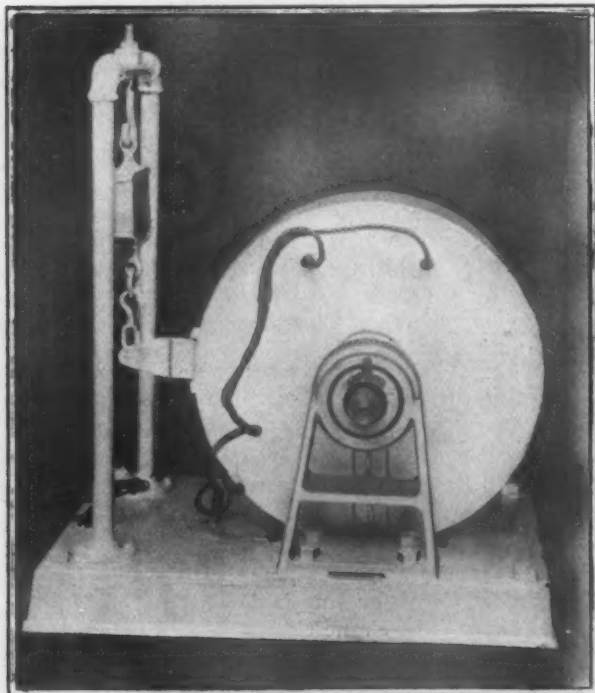


Fig. 1.—The Improved Magnetic Absorption Dynamometer.

changed from one prime mover to another; and it should require a small amount of cooling water.

In considering the above items, it will be noted that the first two items practically eliminate mechanical friction apparatus from the field, while the next three practically eliminate machines depending upon the

friction or resistance of liquids for their operation. With these two classes of apparatus removed, there only remained the principle of magnetic induction for the construction of an efficient absorption dynamometer.

#### Theory

This principle is that a conductor revolving in a field of variable magnetic intensity has an electric cur-

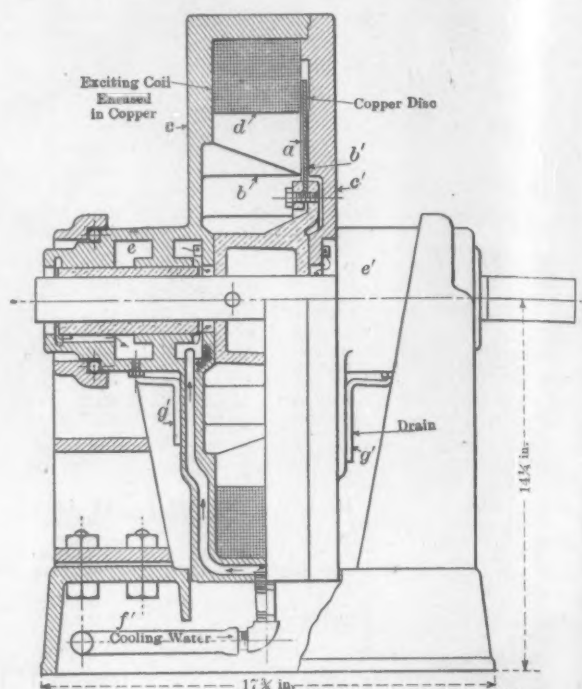


Fig. 2.—End Elevation and Part Section.

rent induced in it. The reaction of this current upon the field that produces it causes a torque between the conductor and the field. There are two ways of dealing with the current induced in the conductor. In the one, the current may be collected by a commutator or slip rings and carried off from the machine; in the other, the current, or rather currents, generated in the conductor, may be allowed to remain, and, circulating in the paths of least resistance, they will ultimately short circuit among themselves and produce heat.

In the first case, a dynamo mounted in a cradle serves as a very efficient and satisfactory type of dynamometer. There are, however, objections to its use. The currents generated must be taken care of either by water rheostats or lamp banks, which require considerable attention and occupy space or utilized in the performance of work which is in most cases impracticable owing to the irregularities in the testing.

If the currents in the conductor are permitted to short circuit themselves, the conductor is heated; the amount of heat produced is equivalent to the work absorbed by the dynamometer and may then be carried off by cooling water. This is the principle utilized in the design illustrated, a description of which follows.

The dynamometer consists of a metallic disk revolving between a set of pole pieces so constructed as to produce a magnetic field of variable intensity. Fig. 1 shows the front view of a machine designed to absorb 45 hp. at from 1200 to 1500 rev. per min. Fig. 2 is an end elevation and part section showing the construction of the dynamometer. It will be seen from this figure that it consists of a copper disk, *a*, mounted on a bronze hub and revolving in front of pole pieces, *b b'*. The magnetic circuit is made up of the casting *c*, the air gap and the cover plate *c'*, which are bolted together and carry the exciting coil *d* and the bearings *e* and *e'*. The magnetic yoke, made up of castings, *c* and *c'*, carrying the field coil and disk, is supported in ball bearings, and prevented from rotating with the disk by the spring balance shown in Fig. 1.

\* Presented at the Spring meeting of the American Society of Mechanical Engineers, Atlantic City, May 31-June 3. For discussion of this paper see the report of this meeting printed in *The Iron Age*, June 9, 1910.

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This latter measures the pull or torque between the rotating disk and the stationary yoke. The magnetizing coil is encased in copper, the terminals being carried out through holes in the casting *c*, which are carefully sealed after the coil is in place.

The heat generated by short circuiting the eddy currents generated in the copper disk, is carried off by the cooling water which enters through the base connection at *f*, Fig. 2, passing up through the bearings into the field casting, and then out through openings which are not shown. This water not only carries off the heat generated, but serves as a lubricant for the bearings. That which passes through accumulates in the central chamber *e*, and is discharged at the base of the machine through the drains *g g'*. Fig. 3 is a detail drawing of the left half of the field casting *c*, shown in section in Fig. 2. It will be seen that there are six poles in the machine. The circulating water enters at *i*, and leaves through the port at *j*. Similar ports are provided in the cover plate.

#### Operation

The engine under test is directly connected to the dynamometer shaft by a flexible coupling, the cooling water is turned on and the engine is started. After

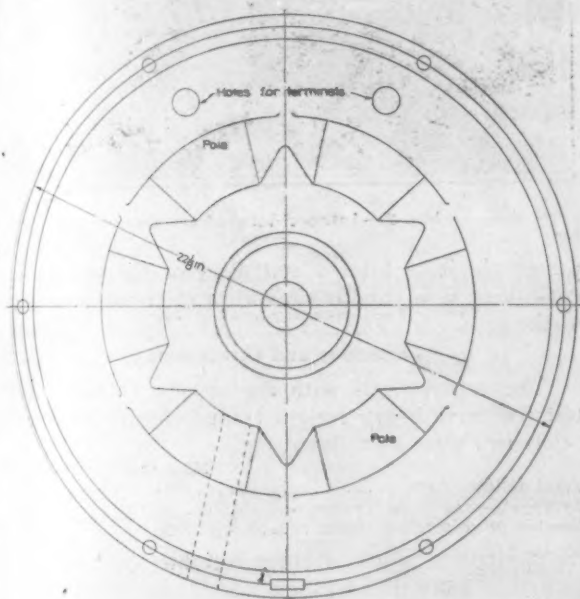


Fig. 3.—Left Half of the Field Casting.

normal speed is reached, the load may be thrown on by energizing the field coil. The amount of current, and consequently the torque or pull on the spring balance is regulated by a rheostat connected in series with the coil. After running a few minutes, the quantity of cooling water is adjusted so that the temperature of the machine does not exceed 150 degrees F. In larger machines the coil may be wound with asbestos covered wire and the temperature permitted to reach 212 degrees, so that the cooling water is evaporated within the dynamometer, which reduces the amount required about 75 or 80 per cent.

The normal working temperature reached, the load on the machine remains absolutely constant, provided the line voltage is constant, for the mechanical friction, which is the bearing friction of the revolving disk, is small and practically constant, and changes in temperature due to changes in the supply of cooling water also affect the load on the dynamometer very little. The regulation by the rheostat is instantaneous and positive. When the dynamometer is driven by a smooth running engine, the torque, as indicated by the spring balance, will not show a variation of  $\frac{1}{8}$  lb., while the balance is sensitive to less than 1-16 lb. This indicates an accuracy that is not necessary even in the most refined testing work.

In the case of the present machine the torque is almost proportional to the speed and is a maximum at about 600 rev. per min. From this point the torque drops off about 15 per cent. at 1200 rev. per min., and remains almost constant from 1200 to 1500 rev. per min.

The torque depends upon the speed, number of poles, thickness of air gap, thickness and shape of the copper disk, and shape and spacing of the pole pieces. By varying the number of pole pieces, and the thickness of the copper disk, the point of maximum torque on the speed torque curve may be shifted anywhere from 25 to 2500 rev. per min.

This type of dynamometer is well adapted either for the testing of high speed motors with a wide variation in speed, such as the automobile engine, or for the testing of slow speed apparatus having a small variation in the speed. It can be built in practically any size from 10 hp. up. The principal disadvantage is the high initial cost, although this is not an item where serious and continuous testing work is going on, as in factories or in the laboratories of technical schools, for the labor saved and the increase in capacity resulting through the use of the machine will in a short time more than pay for the initial outlay.

The efficiency, which may be expressed as the ratio of the energy absorbed by the dynamometer, minus the energy supplied to the exciting coil, divided by the energy absorbed by the dynamometer, may be made anything up to 99.9 per cent., and depends upon the weight of copper placed in the coil. Ordinarily the efficiency is made about 96 per cent., or 4 per cent. of the power absorbed by the dynamometer is required in the form of electrical power for excitation.

#### New York Meeting of the American Iron and Steel Institute

The American Iron and Steel Institute, W. J. Filbert, secretary, makes a preliminary announcement concerning its first formal meeting, which will be held in New York City in October. Invitations to attend have been sent to leading representatives of the iron and steel industries in European countries and acceptances have already been received from a considerable number. The sessions will open at the Waldorf-Astoria Friday, October 14, at 10.30 a.m. On the same day there will be an afternoon session, and the entire day will be devoted to the address of President E. H. Gary and the reading of papers. In the evening there will be a banquet at the Waldorf-Astoria. For Saturday, October 15, an excursion around New York harbor has been planned. Various railroad terminals and important industries will be visited.

To give the foreign guests an opportunity to visit typical plants, the stated meeting will be followed by an excursion, which will probably be by special train. Leaving New York Sunday, October 16, at 8 p.m., the party will arrive in Buffalo Monday morning, where the works of the Lackawanna Steel Company will be visited. A trip will also be made to Niagara Falls. Leaving Buffalo in the evening of October 17, the train will arrive in Chicago the next morning. Tuesday and Wednesday will be spent in visiting the Gary Works and other plants in the Chicago district. Pittsburgh will be reached Thursday morning, and Friday and Saturday will be spent in that district. From Pittsburgh the party will take train Friday evening for Washington, where the Institute will be received by the President on Saturday, and the trip will terminate in New York Sunday morning, October 23.

Among those who will prepare papers for the meeting are J. A. Farrell, president of the United States of the Jones & Laughlin Steel Company, and Charles Kirchhoff. Steel Products Company; Willis L. King, vice-president

# Freight Train Resistance\*

## Its Relation to Average Car Weight

BY PROF. EDWARD C. SCHMIDT, URBANA, ILL.†

Train resistance varies not only with the train speed, but also with the average weight of the cars of which the train is composed. While this fact has been known for some years, it has found inadequate expression and but little application. In the establishment of their tonnage ratings many railroads have altogether ignored it. In the tonnage ratings of a few roads it is recognized to the extent of allowing a difference in rating between trains composed of loaded cars and those consisting entirely or partially of empty cars. A still smaller group of railroads has fully recognized the significance of the facts above stated in establishing their tonnage ratings, which in such cases are usually termed "adjusted" or "equated" ratings. Most of these adjusted ratings have been empirically determined. In the few cases where they rest upon experiments made to determine the variations in train resistance with respect to car weight the data and results of such experiments have not been fully published. Existing train resistance formulæ likewise fail in most cases to take into account these variations of resistance with car weight; and probably much of

owned jointly by the University of Illinois and the Illinois Central Railroad, and were carried out on the Chicago division of this road. The exterior and interior of this car are shown in Figs. 1 and 2.

In the preparation of the report the aim has been to



Fig. 1.—Car Employed in Making the Tests.

the divergence among them is properly to be ascribed to this fact.

In view of the facts just stated it has seemed desirable to make the tests whose results are here recorded. They were planned to determine the resistance of freight trains under the usual conditions of operation; and were designed to disclose at the same time, if possible, the relation existing, at any given speed, between train resistance and average car weight. Since the chief use of such information is in the production of locomotive ratings, the conditions of the tests have been made like those which prevail in normal freight train operation. The speed range, for example, is from 5 to 35 miles per hour; and the trains experimented upon were trains in regular service, and usual in their make-up. The track upon which the tests were made is believed to be representative of good main line construction. The tests have been made as part of the research work of the Engineering Experiment Station of the University of Illinois, conducted by the railway engineering department. They were begun in April, 1908, and were completed in May, 1909. All tests were made by means of Test Car 17, a dynamometer car,



Fig. 2.—Interior View of the Car.

present in it as brief a statement of the results and conditions as is compatible with a clear understanding of the tests.

### Summary and Conclusions

The report deals with the results obtained from tests of 32 ordinary freight trains, whose chief characteristics were as follows:

|                                   | Minimum. | Maximum. |
|-----------------------------------|----------|----------|
| Total weight, tons.....           | 747      | 2,908    |
| Average weight per car, tons..... | 16.12    | 69.92    |
| Number of cars in the train.....  | 26       | 89       |

The trains, whose average weights were less than 20 tons or more than 60 tons, were composed of cars of nearly uniform weight; while those whose average car weights were between 20 and 60 tons were either

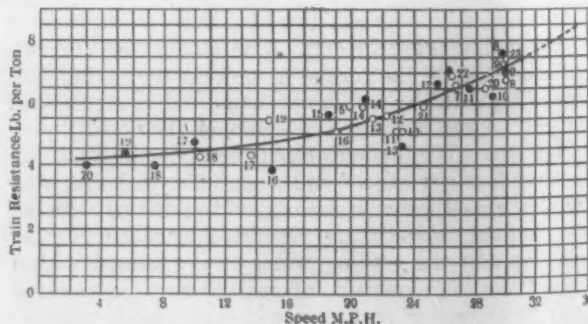


Fig. 3.—Typical Curve Showing the Relation of Resistance to Speed.

homogeneous or mixed as regards the weight of the individual cars. The tests were made during generally fair weather. The minimum air temperature during any test was 34 degrees, the maximum 82 degrees. The approximate average wind velocity prevailing throughout one test was 25 miles per hour; during all the others it was less than 20 miles per hour. The tests were made upon well constructed and well maintained main line track, 94 per cent. of which is laid with 85-lb. rail, the remainder being laid with 75-lb. rail. Except through station grounds, where screen-

\* Presented at the spring meeting of the American Society of Mechanical Engineers, Atlantic City, May 31-June 3. For discussion of this paper see the report of this meeting printed in *The Iron Age*, June 9, 1910.

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ings or cinders are used for ballast, the track is full ballasted with broken stone.

The results of the tests are presented in Figs. 5 and 6, and in the equations given later on which are each different expressions of the same facts. The results are applicable to trains of all varieties of make-up to be met with in service, and may be applied, without incurring material error, to trains which are homogeneous and to those which are mixed as regards individual car weight. They are primarily applicable to trains which have been for some time in motion. When trains are first started from yards, or after stops on the road of more than about 20 minutes' duration, their resistance is likely to be appreciably greater than is indicated by the results here presented.

#### The Methods and Means Employed in Conducting the Tests

The tests were carried on by means of the dynamometer car here referred to as Test Car 17, which, when not in use, is held at Champaign, a district terminus. The car was operated from time to time in the regular trains leaving this point, partly northbound and partly southbound.

The plan was to determine, for each of the trains

information essential to the investigation. Supplemented by an accurate profile and a record of train weight, they enable net train resistance to be calculated at any position of the train upon the road. The time record provides a means of calibrating and checking the speed curve. The pressure in the brake cylinder was recorded merely to make it possible to distinguish those periods during the test when the brakes were applied to the train; it being obviously necessary to ignore such portions of the record when making the calculations. The relative wind velocity and direction were obtained by an anemometer and a wind vane mounted on the roof of the test car. When compounded with the known speed and direction of motion of the car, these data permit the determination of the actual wind direction and wind velocity with respect to the track, which were recorded in each test for each point at which train resistance was determined. The location of the car upon the road was defined by marking upon the test car record the position of mile posts and stations at the moment they passed the car. Data concerning the train were obtained by one or two observers who had no other duties. All trains were

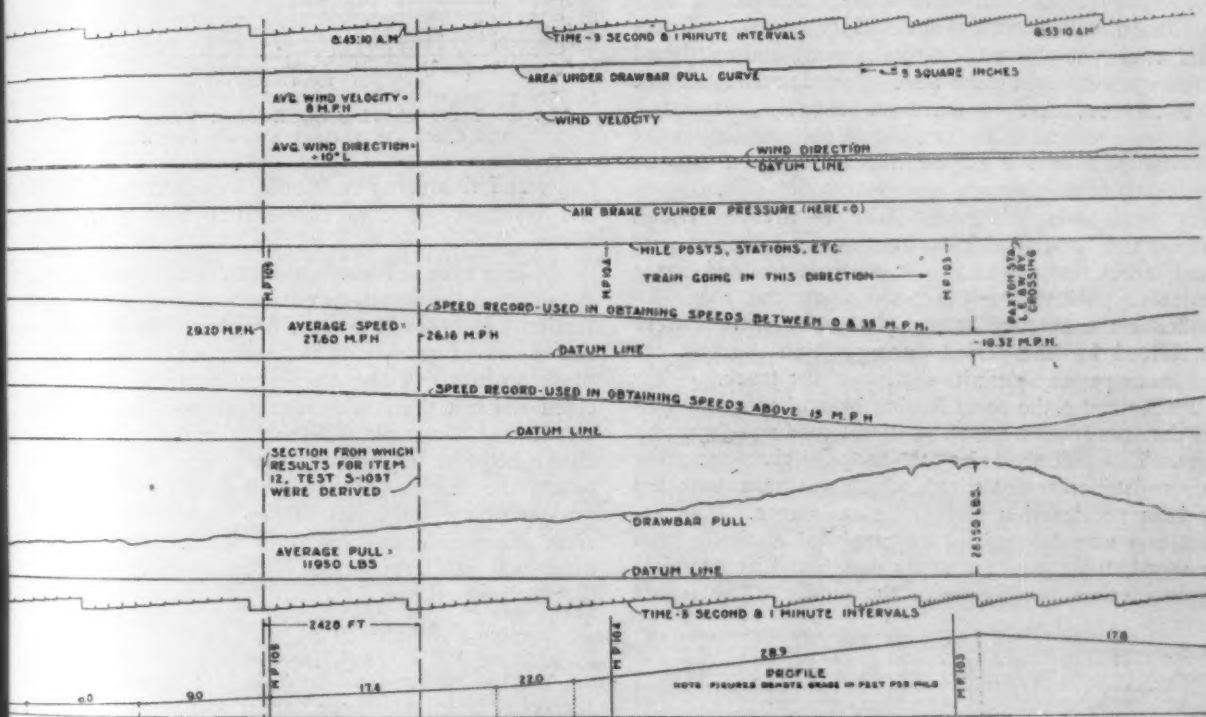


Fig. 4.—A Portion of One of the Test Records.

experimented upon, the relation of its resistance to its speed. This information was to be finally expressed as a resistance speed curve such as is shown in Fig. 3. The trains were so selected that their average car weights varied through as great a range as possible.

During each test the following information was obtained: The drawbar pull of the locomotive; the train speed; a continuous record of time elapsed from the beginning of the test; the pressure in the brake cylinder of the test car; the direction of the wind relative to the direction of motion of the car; the velocity of the wind relative to the car; the location of the test car upon the road; air temperatures and other weather conditions, and data concerning the train, such as its weight, &c.

The information on the first six points was obtained in the form of continuous graphical records upon the chart shown in Fig. 4, which is produced by the apparatus of the dynamometer car, from which any of the quantities may be determined at any point upon the road.

The curves of drawbar pull and speed provide the

weighed to determine their tonnage and their lengths recorded.

All test car instruments were calibrated before the tests, and their calibrations were frequently checked during the progress of the investigation. All observers were men experienced in the operation of the test car, and many of them had participated also in the work of calculation, and were consequently aware of the points at which alertness and care were especially needed. No effort has been spared, in conducting the tests, to insure accuracy in the data. These facts are here mentioned as having some significance to one who may undertake to estimate the reliability of the results.

#### Test Conditions and Train Data

The test trains were all of such make-up as naturally resulted from the traffic conditions in the Champaign yards. For most of the tests the test car was coupled into the trains selected by the trainmaster, solely with reference to his convenience in operating and returning the test car. They include trains made up almost entirely of empty gondolas, others with con-

siderable variation in both load per car and kind of car, and still others composed almost entirely of loaded box cars or of loaded gondolas.

Practically all the trains were weighed upon one of the two track scales at Champaign in the usual manner, by pulling the train over the scales and weighing the cars successively without uncoupling. All the cars were provided with the usual four-wheeled truck, presumably the majority of the cars had journals conforming to the specifications of the Master Car Builders' Association, and it is safe to assume that all trucks were provided with wheels of 33-in. standard diameter.

#### Methods Employed in Calculating the Results

The immediate purpose in making the calculations was to produce for each test a curve showing the relation between resistance and speed, for as great a variety of speeds as the data would permit. This involves calculating the train resistance at various positions of the train upon the track, and the first step is the inspection of the test car record in order to select suitable points or sections at which the resistance may be calculated. The considerations of first importance are, that the points should finally represent as great a speed range as possible, and be approximately evenly distributed within this range. Only points and sections where the entire train was running and continued to run upon straight track were selected; resistance due to track curvature is therefore entirely eliminated. The data essential to the process of calculation are the drawbar pull of the engine, the train speed and its acceleration, the tonnage and the profile. Two processes were used, designated here as Method 1 and Method 2. By Method 1 the momentary values of pull, speed, acceleration and grade were determined for a particular position of the train upon the road; by Method 2 the average values of these quantities were determined for the period during which the test car was passing over a definite section of the track.

In Method 1 the point having been chosen, the pull and the speed were found by direct readings from the chart. This pull divided by the tonnage gives the gross train resistance at this speed, which was next corrected for both acceleration and grade resistance. The acceleration was determined by graphical methods from the speed curve, and the grade was found by correlating the train's position with the profile. The points

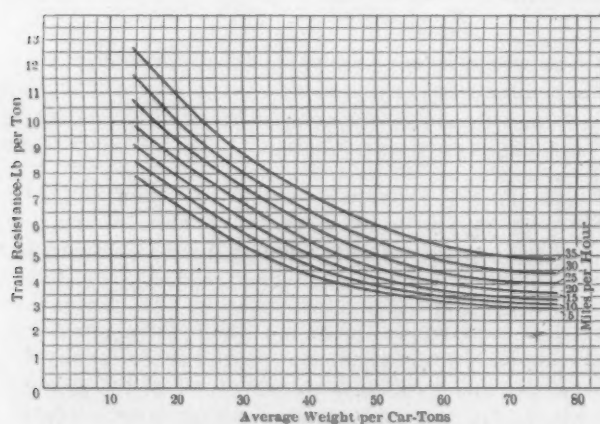


Fig. 5.—Curve Showing the Relation Between Resistance and Average Car Weights at Various Speeds.

were all so selected that at the moment under consideration the entire train was on a nearly uniform grade. Method 1 results in momentary values of train resistance at the points considered.

By Method 2 the average train resistance was determined for the period during which the test car at the head of the train was passing a selected section of the track corresponding to a certain length or section on the test car record, which was so selected that the speed of the car when entering was nearly equal to its speed when leaving, and further so that no considerable vari-

ations in speed occurred during transit over the section. The sections chosen have varied in length from about  $\frac{1}{4}$  to 1 mile. The variations in speed in passing the section have generally amounted to less than 2.0 miles per hour, and the maximum is 11.7 miles per hour.

These portions of the chart being chosen, the average pull was next found by determining the average ordinate of the curve of drawbar pull, and the average speed was found by means of the section length and the time record. Gross resistance in pounds per ton was next derived by dividing this value of pull by the ton-

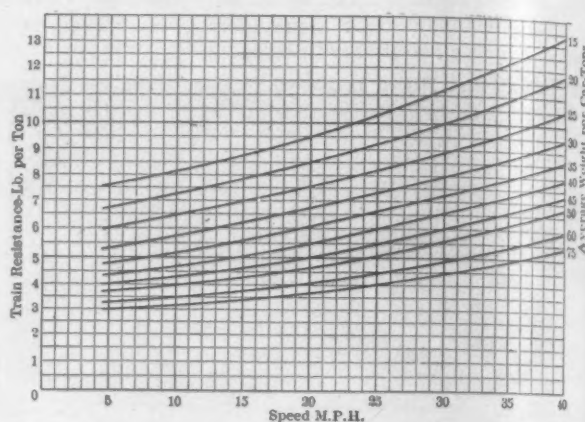


Fig. 6.—Curve Showing the Relation Between Resistance and Speed for Various Average Car Weights.

nage, and this gross resistance was then corrected for the resistance due to acceleration and grade as in Method 1.

In this case the average acceleration was found by considering the speeds at entrance to and exit from the section. In order to correct for grade, the elevation of the center of gravity of the train was determined for those positions of the train at which the test car entered and left the section, the difference between these elevations being the effective average grade, which either helps or opposes the locomotive while the train passes the section. These elevations of the center of gravity of the train may not be determined with sufficient accuracy unless the train at the moment is on a practically uniform grade. The section limits were therefore so chosen.

Method 2 results in a value of average train resistance for the average speed at which the train passes the section under consideration. It would be rigidly correct if train resistance varied uniformly with speed, in other words, if the curve showing the relation of resistance to speed were a straight line, but such is not the case, and the process therefore gives results which are slightly in error. However the section was so chosen that the difference between the speeds at entrance to and exit from the section was small; and for the speed range represented by this difference, the curve of train resistance deviates but little from a straight line. Such error as does result from the process is, therefore, very small and of no moment whatever when compared with the variations due to natural causes that occur in the resistance itself.

The two methods are fundamentally alike. Although the first is the less laborious, it requires the determination of acceleration at a point on the speed curve, which it is sometimes difficult to make accurately. For this reason the second method is generally preferable. Method 2 also deals with average values, and therefore tends to eliminate from the results the incidental momentary variations in resistance. Consequently the second method has been employed whenever possible, and the first method generally resorted to only in cases where the limitations imposed in the selection of sections for Method 2 would have resulted in too few values from which to plot the resistance curves. Of all the individual resistance values incor-



porated in the report only 32 per cent. were determined by Method 1. The care exercised in the calculations and a study of the plotted values obtained by both processes, seem to warrant the conclusion that their results are equally reliable. In Fig. 3 the circles represent values derived by Method 1, and the circular black spots represent values obtained by Method 2.

Even in freight train operation the tractive effort required to produce acceleration in speed is frequently greater than that required to overcome all other resistances combined. To produce, for example, an acceleration of 0.1 mile per hour per second, requires a tractive effort of about 9 lb. per ton, in addition to that required by net train resistance and grade resistance. Since the acceleration resistance may constitute so large a proportion of the gross resistance, it is important that its determination be made with great care. This fact has been impressed upon all concerned with these tests. In calculating the acceleration resistance, both the force required to produce acceleration in the rotation of the wheels and axles, and the force required to produce the acceleration in the motion of translation of the train as a whole were determined.

The test car records make it possible to distinguish those portions of each test where the brakes were applied. Such places, few in number, were of course avoided in selecting points and sections for determining resistance. The records also show where hot boxes and unreleased brakes were discovered in the train, and such defects were given consideration in making the calculations. They occurred infrequently, and their effect could not be distinguished in the results. While therefore such portions of the record were avoided if convenient, sections and points on the charts otherwise suitable for calculation, were not rejected on these accounts.

Early in the progress of this work, when low air temperatures were first encountered, it became apparent that when the train was first started from rest, its resistance, calculated for a number of points at which the speed was the same, occasionally was unusually high. This was true not only for those portions of the run made immediately after leaving the yards; but also for those portions immediately following stops on the road. For a number of tests such resistance values were plotted with respect to the distances from the yards of the points to which they apply. This process disclosed a surprisingly regular decrease in the resistance, until a distance of approximately 10 miles was reached, after which the resistance had settled down to a fairly uniform value. Similar variations were found to occur to some extent during tests where the air temperature was as high as 50 or 60 degrees. Since the variations in resistance are so great during the early part of the run no point or section within about the first 10 miles has been selected for calculation in any test. If other points or sections, located farther from the start, were near stops, such points were rejected unless further investigation proved that at these places the train resistance had become nearly uniform in value. Fortunately operating conditions were such as to entail few stops, and the selection of points and sections for the calculations has not been unduly limited on these accounts. The effect of these limitations is to make the results of this investigation primarily applicable to trains which have been for some time in motion. Since, however, stops are not usually made upon ruling grades; and if stops are made at other places the locomotive has available tractive power in excess of the requirements, the results of these tests are generally applicable in the solution of tonnage rating problems, except where the ruling grade occurs near a yard or other point where the trains are made up. In such cases the tonnage determined from the resistance curves here presented may prove to be somewhat too great.

All reasonable precautions have been taken to at-

tain accuracy in the calculations. In determining each value of resistance, each step was duplicated at a different time, and generally by a different person. The transcription of all tables, the plotting of points and the drawing of curves have been similarly checked.

#### Results of the Tests

The immediate result of each test is a curve which shows for the train under consideration, the relation existing between train resistance and speed. Fig. 3 is such a curve and is fairly representative of the entire group of curves, and such discussion of it as follows is general in its application. The plotted points show unmistakably an increase in resistance as the speed increases, and the curve drawn represents the mean relation between resistance and speed. In Fig. 3 the maximum variation from this mean of any calculated value of resistance is about 20 per cent.; the next largest variation is 16 per cent., and other calculated values of resistance generally differ from the values determined from the curve by less than 10 per cent. In a majority of the tests the maximum variation is less than this.

These differences may be due in part to accumulated errors in the instruments or in the calculations. In all cases, however, where the calculated value of resistance varied by an unusual amount from the mean, all calculations leading thereto were repeated and errors thus discovered are eliminated from the report. The explanation for such differences need not be sought further than in the variations which actually occur from time to time, in the resistance itself. Variations in such components of train resistance as flange friction and wind resistance are probably sufficiently great to account for the differences discussed above. The data do not permit the influences of such components of resistance to be differentiated.

The curve drawn for each test has been accepted as representing the average values of net train resistance, with a degree of accuracy sufficient for the purpose of rating locomotives. Such temporary excess of resistance as may be expected to occur will generally be absorbed in that reserve in the tractive effort of the locomotive which must be allowed in any system of tonnage rating.

Fig. 5 presents the final results of the whole research. Each of these curves shows the mean relation which existed during the tests, between car weight and resistance at a definite speed, and it is believed that they are generally applicable to ordinary American freight trains, provided the conditions surrounding their operation are like those which prevailed during these tests. These curves enable one to determine the probable mean resistance of any such train, at speeds between 5 and 35 miles per hour, provided the average weight of the cars composing the train be known.

While Fig. 5 presents the main results of the experiments, the form in which these results are expressed is unusual. Ordinarily train resistance is expressed either as a curve or equation which defines the relation between resistance and speed, instead of the relation between resistance and car weight. Obviously to express the results of these experiments in the usual form a single curve will not suffice, since the influence of car weight cannot be thereby made evident. A number of curves will be required for this purpose, each of which will apply only to a definite average car weight. Fig. 6 presents such a group of resistance speed curves, which have been derived directly from the curves of Fig. 5, and it therefore exhibits in different form only such information as is obtainable from the latter.

The relation between the two may be made clear by explaining the derivation of the upper curve in Fig. 6, the one applying to a car weight of 15 tons. In Fig. 5 the ordinate corresponding to an average car weight of 15 tons cuts the seven curves there drawn at points where the mean resistance values are 7.62, 8.20, 8.81, 9.56, 10.37, 11.24 and 12.25 lb. per ton, corresponding

to speeds of 5, 10, 15, 20, 25, 30 and 35 miles per hour respectively. These values are the co-ordinates of seven points on a resistance speed curve applying to a car weight of 15 tons. These seven points have been plotted in Fig. 6, and the upper curve has been passed through them and extended to 40 miles per hour. The other curves were derived by a like process.

The relation between resistance and speed shown by each of the curves of Fig. 6 may be also expressed in the form of an equation. Formulae 1 to 13 below are such equations, by which resistance may be calculated for any speed and for various car weights. In the formulae  $R$  is the resistance expressed in pounds per ton,  $S$  is the speed expressed in miles per hour, and  $W$  is the average weight of the cars in the train expressed in tons. The formulae are purely empirical, and are simply equations of parabolas so selected as to correspond very closely with the curves. The correspondence between the formulae and the curves is such that the maximum difference between any value of resistance obtained by the formulae, and the corresponding value obtained from the curves is 0.5 per cent. Since these are empirical equations their use should not be extended beyond the speed limits shown in Fig. 6.

The final results of the research are presented in Fig. 6 and in Formulae 1 to 13. It is believed that by means of either the figure or the formulae, the resistance of ordinary freight trains may be fairly accurately predicted; provided the conditions surrounding their operation are similar to those which prevailed during these tests and have been fully stated.

#### Train Resistance Formulae.

- When  $W = 15$  tons;  $R = 7.15 + 0.085 S + 0.00175 S^2$ ..... (1)  
 When  $W = 20$  tons;  $R = 6.30 + 0.087 S + 0.00126 S^2$ ..... (2)  
 When  $W = 25$  tons;  $R = 5.60 + 0.077 S + 0.00116 S^2$ ..... (3)  
 When  $W = 30$  tons;  $R = 5.02 + 0.066 S + 0.00116 S^2$ ..... (4)  
 When  $W = 35$  tons;  $R = 4.49 + 0.060 S + 0.00108 S^2$ ..... (5)  
 When  $W = 40$  tons;  $R = 4.15 + 0.041 S + 0.00134 S^2$ ..... (6)  
 When  $W = 45$  tons;  $R = 3.82 + 0.031 S + 0.00140 S^2$ ..... (7)  
 When  $W = 50$  tons;  $R = 3.50 + 0.024 S + 0.00140 S^2$ ..... (8)  
 When  $W = 55$  tons;  $R = 3.38 + 0.016 S + 0.00142 S^2$ ..... (9)  
 When  $W = 60$  tons;  $R = 3.19 + 0.016 S + 0.00132 S^2$ ..... (10)  
 When  $W = 65$  tons;  $R = 3.06 + 0.014 S + 0.00130 S^2$ ..... (11)  
 When  $W = 70$  tons;  $R = 2.92 + 0.021 S + 0.00111 S^2$ ..... (12)  
 When  $W = 75$  tons;  $R = 2.87 + 0.019 S + 0.00113 S^2$ ..... (13)

#### Discussion of the Results

Among those trains which are regarded as normal there are two or three whose resistance at some speed varies from the mean, as expressed in the curves, by as much as 23 per cent. The great majority, however, vary from this mean by about 10 per cent. or less. The data present no satisfactory general explanation for these differences in the resistance of different trains of like average weight per car. They may be due to difference in external conditions, or in train condition and make-up. Whatever the explanation, it is significant that about one-half of the trains experimented upon developed a resistance about 9 per cent. in excess of the mean resistance, which would be predicted by the use of Figs. 5 and 6. Obviously a similar excess may be expected with any train; it is suggested therefore that in determining the resistance of trains on level tangent track for the purpose of rating locomotives under operating conditions which demand conservative ratings, 9 per cent. be added to the resistance values obtained from the curves and equations presented. Such considerations are of little practical importance in rating locomotives for speeds above 15 miles per hour. In such cases an excess in resistance over that expected can result in nothing more serious than failure to realize the expected train speed.

It should be understood that this 9 per cent. allowance is intended to cover probable variations in the resistance of different trains under normal operating conditions. It in no way takes the place of that additional reserve which must be allowed to cover unusual variations in resistance due to low temperatures or high

winds, nor of that reserve in the tractive effort of the locomotive necessitated by operating conditions which reduce the efficiency of the locomotive itself.

Objection may be made to the form of expression adopted in Fig. 5, in which the resistance is expressed solely in terms of average car weight, to the apparent neglect of the influence of those elements of resistance, such as air resistance, which are independent of weight, and which probably vary only with the number of cars in the train. The neglect is only apparent, however, for the process by which Fig. 5 was derived involves, although indirectly, recognition of the influence of the number of cars. It is quite likely that if Fig. 5 were applied to determine the total resistance of a single car, the result would be in error. Whatever objection may be urged against the form of expression adopted, it remains true that it rests upon experimental results obtained with trains of usual length, and that in practice one is not likely to encounter trains which present in this respect any extreme variation from the test data. The form of expression will not lead to error unless misapplied, and it was chosen because the results may be conveniently used in establishing tonnage ratings. It might likewise have been more rational to express the resistance in terms of load per axle instead of load per car, since the latter can operate to cause variations in resistance only in so far as it affects the former. Since, however, all American freight cars have four axles, the expression in either form would be identical. Convenience in application warrants the choice made in this respect also.

In Fig. 5 those portions of the curves which apply to average car weights below 20 tons were derived from trains which were quite homogeneous in their make-up as regards weight per car. These trains were necessarily composed almost exclusively of empty cars, since an average car weight of 20 tons or less cannot otherwise be obtained with cars of current design; and being empty they will be uniform in weight. Similarly for average car weights above 55 to 60 tons the test trains were necessarily uniform in make-up. For trains of average car weights below 20 and above 60 tons these curves are accepted, therefore, as valid, and applicable to any train to be met with in practice.

In Fig. 5 those portions of the curves corresponding to car weights of from 20 to 60 tons were, on the other hand, derived from trains which presented considerable diversity in make-up as regards weight per car. Some of these trains were composed almost entirely of loaded cars, others contained large proportions of both empty and loaded cars. In presenting the results in the form adopted the assumption is that the curves will be used throughout their entire range of average car weight to determine the total resistance of both homogeneous and mixed trains, and that, when so applied, they will lead to no material error. In view of the facts just stated it is pertinent to inquire whether this assumption is justifiable.

Assume two trains of equal tonnage, and of the same average weight per car. Assume further that one is composed of cars uniform in weight, and the others of cars of different individual weights. Now, if such trains are to have equal total resistance, it can be shown that the variation in resistance per car of the individual cars must be directly proportional to their weight. This implies that the curve showing the relation between total car resistance and car weight at a given speed must be a straight line, if homogeneous and mixed trains are to have equal total resistances at this speed. From Fig. 5 there have been derived such curves, showing the relation between car resistance and car weight. These curves correspond quite closely, but not exactly, with straight lines; and the correspondence is especially close for those portions of the curves which apply to car weights between 20 and 60 tons. From these facts we may conclude that the



curves of Fig. 5 are not quite equally applicable to mixed and homogeneous trains, but nearly so, and that if the curves are applied to both kinds of trains, we may expect a slight error in the resulting total train resistance.

Within the last two years the opinion has been expressed in some quarters that train resistance between speeds of 5 and 35 miles per hour is constant. It is proper to point out that there is nothing in the data here presented to support such a conclusion.

The wind velocities prevailing during the tests were generally less than 20 miles per hour. The data do not permit the influence of such winds to be differentiated from the other elements affecting resistance; but they do warrant the conclusion that this influence is small. In the introduction, train resistance was defined as the resistance in still air, whereas throughout the report the term is applied to the test results from which the influence of wind has not been eliminated. This inconsistency has been deliberately incurred to avoid unwieldy expression, and is partially justified by the facts just stated.

There is no point in comparing the results of these tests with formulæ in which the influence of car weight is given no consideration, nor with those not derived from tests on American cars of recent design. The results obtained on the Chicago, Burlington & Quincy Railroad and on the Pennsylvania Railroad are selected for comparison. When plotted on Fig. 5 of this report they show very close correspondence with the curve there drawn for 10 miles per hour, for car weights from 25 to 70 tons; while for car weights below 25 tons they indicate resistance values as much as 20 per cent. in excess of the results obtained during these tests.

### The Estep Molding Fixtures

A simple appliance for hand manipulated bench molding apparatus, to facilitate drawing patterns, has been patented by Ezra Estep, superintendent of the foundry of the Sandwich Mfg. Company, Sandwich, Ill. Fig. 1 is a sectional view of the apparatus and Fig. 2 is a bottom plan view of a pattern plate and stripping plate.

Preferably, two-part hinged snap flasks are used. The pattern plate employed is interposed between the cope and nowel and has end flanges projecting beyond the sides of the flask when the parts are assembled. Each of the flanges has a hole to receive one of the dowel pins of the flask. Half patterns are formed upon the opposite sides of the pattern plate. The patterns shown in Fig. 2 are for a number of mongrel gears. The patterns and pattern plates are metal and the former are secured to the latter by screws.

A stripping plate is used in connection with the pattern plate to bear upon the face of the sand in the flask, during the withdrawal of the patterns. This stripping plate is of the same area as the pattern plate and its body portion is cut out to fit snugly over the nowel portion of each of the patterns. Flanges are formed on the stripping plate and correspond to the end flanges of the pattern plate. The nowel part of each pattern has a shank to separate it from the pattern plate, so that the full pattern protrudes through the stripping plate when the latter is in contact with the pattern plate. The stripping plate is connected to the pattern plate by bolts, which permit a limited separation, equal, if desired, to the depth of the pattern. Handles are provided for lifting the pattern and stripping plates and for separating them. These handles are pivoted to the stripping plate and have cam shoulders for bearing against the face of the pattern plate to separate the plates when the handle is swung to the service position. These handles are shown at the sides of Fig. 2.

In use the flask members are assembled with the pattern and stripping plates interposed between them

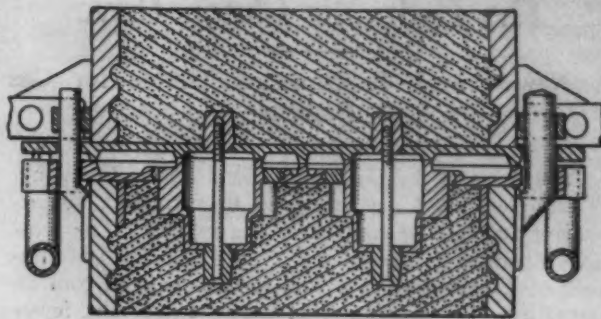


Fig. 1.—Vertical Section of the Estep Molding Apparatus.

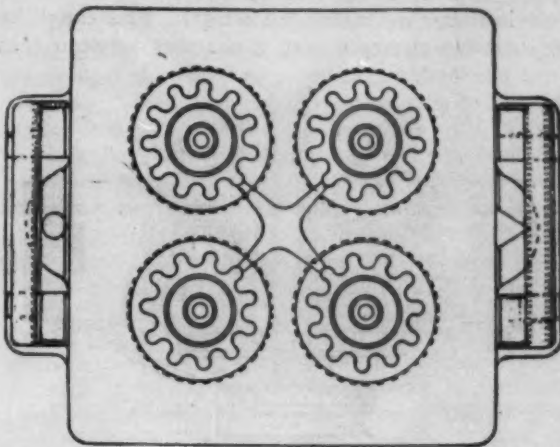


Fig. 2.—View of the Pattern and Stripping Plates from the Under Side.

and the handles in the position shown in Fig. 1 to permit the pattern plate to rest on the stripping plate, so that the pattern parts protrude through the stripping plate. The nowel is then filled with sand in the usual manner, and the sand rammed against the face of the stripping plate. The apparatus is then turned over to bring the cope uppermost. This is filled with sand and the sand rammed against the back of the pattern plate. The cope is now removed in the usual way, and the pattern withdrawn from the sand contained in the nowel by raising the handles. The pattern plate is separated from the stripping plate, and the latter bears upon the face or parting of the sand during this operation and serves to prevent injury to the edges of the mold by the withdrawing of the patterns. The pattern and stripping plates are now removed, and the parts of the mold reassembled for pouring, after which the flask is removed from the mold by opening the hinged frames.

### A New Steel Casting Plant for Pittsburgh.

Charles Bailey and Joseph A. Kelly, Renshaw Building, Pittsburgh, formerly identified with the Reliance Tube Company of that city, have taken over the plant of the Scaife Foundry & Machine Company, Twenty-eighth and Smallman streets, Pittsburgh. They propose to incorporate, and will then rearrange the plant for the manufacture of high grade steel castings. The new owners have not definitely decided upon the corporate title nor the details as to the plant's capacity, &c. They are now going over this matter, and will shortly have inquiries out with engineers for the construction of one or more open hearth furnaces. They expect to have the equipment installed and the plant ready for operation about the end of October.

One of the two 100-ton tilting open hearth furnaces of the Tennessee Coal, Iron & Railroad Company, on which construction work has been in progress at Ensley, Ala., for some months, was put in operation last week. The other can be completed by September. This gives the company eight furnaces of 100 tons capacity each.

## The Hydraulic Clutch Drive

### A New Power Transmission Device for Gas Engines

The drive of the Hydraulic Clutch Drive Company, Washington, D. C., is designed to furnish a simple, positive and reliable control for gas engines. The principal advantages claimed for it are flexibility and simplicity. To the user it is said to offer ease of control, longer life of the engine and the car, less weight, fewer parts, and lower maintenance expense, while to the manufacturer it offers less cost to equip, no loss of power in transmission and less weight. This clutch has two rotatable elements with a chamber between them

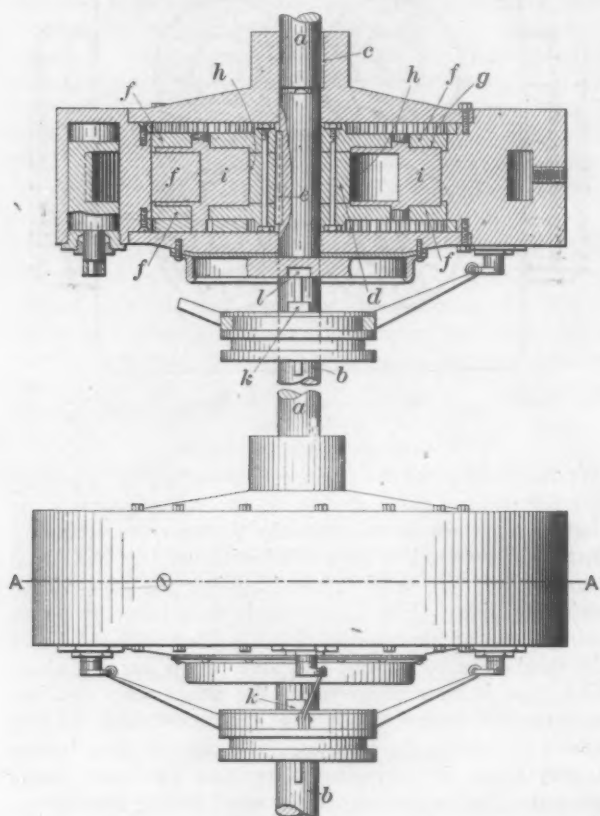


Fig. 1.—Axial Section on the Line B-B of Fig. 2 and Exterior of the Hydraulic Clutch Drive.

containing fluid that is driven around in passages by the driving element, and these passages are provided with valves to obstruct the flow of liquid to a greater or less extent and thus serve to couple the parts together and transmit the motion. Fig. 1 is an exterior and longitudinal sectional view of the clutch and Fig. 2 is a transverse section.

The outer casing of the clutch is formed of two disks and a spacing rim held in place between them by bolts. This rim is weighted and acts as a flywheel. The shaft sections are coaxial and are indicated at *a* and *b*, the former being the driving shaft and the latter the driven one. The outer casing is secured to the driving shaft by a key, *c*, and the driven shaft projects at its end within the casing and abuts the other shaft to sustain any end thrust. The driven shaft carries a hub, *d*, fitting between the side plates of the casing and fastened by a key, *e*. For convenience in assembling this hub is built up of three pieces, fastened together by countersunk bolts. It has annular peripheral flanges, *f*, producing an annular chamber, *g*, extending around within the rim of the casing, and the body of the hub also has a pair of opposite segmental recesses, *h*, which contain the rotatable pistons, *i*, fitting into the recesses and the chamber. These pistons have trunnions on opposite ends which are supported in bear-

ings in the annular flanges and carry spur gears on their ends. These gears are made fast to the trunnions by keys and are fitted in circular depressions or seats formed in the outer side of the flanges of the hub. They mesh with internal gears set in rabbets in the opposite sides of the rim and within the side plates of the clutch.

Two pistons at diametrically opposite points, each carrying a pair of gears, sustain the drive when the parts are coupled.

Each of the pistons *i* has the form of a cylindrical block with a portion cut away, leaving a solid part which is segmental in cross section and whose inner surface coincides in the degree of curvature with the circumference of the hub, as is clearly shown in Fig. 2. The diameter of the piston is such that its outer surface is in rolling contact with the inner surface of the rim of the clutch, which is provided with a series of abutments on its inner side, so located that one of the two pistons will always be in active position. These abutments project to bearing contact with the hub across the chamber *g* and divide it into three parts. The surface of these abutments is that of a cycloid described by a point on the surface of the piston which rolls along the inner surface of the rim, thus keeping the surface of the piston in contact with the abutment at some point during the whole of its motion. The three chambers produced by the abutments are connected at the opposite ends by passages cored in the rim, whose cross sectional area equals that of the chambers, thus rendering a free flow possible. The flow of liquid through these passages is controlled by the os-

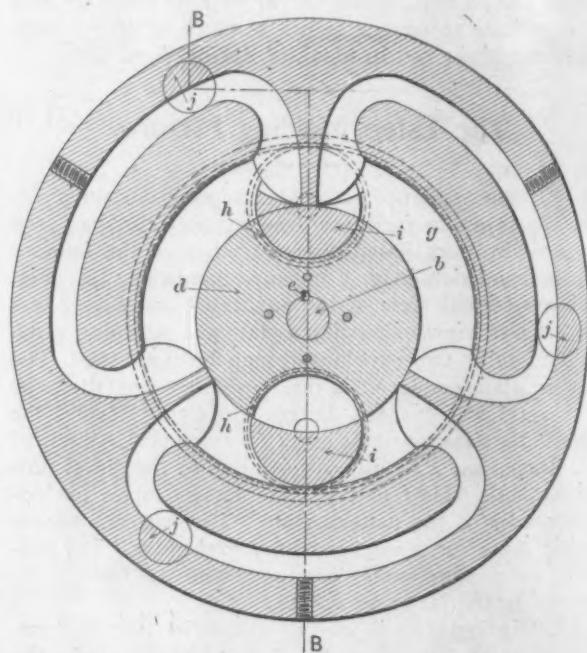


Fig. 2.—Perpendicular Section on the Line A-A of Fig. 1.

cillating valves *j*, whose sectional port area is equal to the similar area of the passages. These valves are encased in the rim and their stems project through the side. These valves may be turned to open or close the passages to a greater or less extent and consequently control the circulation of the liquid.

A shifting sleeve having a circular groove with a collar engaging it, connected by rods to crank arms on the valve stems, is employed to control the valves. The sleeve may be shifted along the shaft by an ordinary yoke or lever and when so shifted will turn the valves its full movement, completely closing them. This sleeve is keyed on the driven shaft and the collar is free to turn on the sleeve, so that the valves are closed when the sleeve is thrust toward the clutch casing. To take the strain off the gears and other parts of the fluid clutch after they have become coupled together a positive clutch is provided. This consists of a collar or disk fastened to the plate of the casing and extend-



ing around the shaft. This disk is fastened to the plate by a ring clamp and screws, with a leather disk placed between the collar and the casing. This collar has a notch, *l*, and the shifting sleeve has a lug, *k*, which will enter the notch when the sleeve is shifted to the full extent.

The arrangement and construction are such that the valves *j* will be fully closed before the lug *k* reaches the notch *l*, and accordingly the shifting lever or device may be stopped at that point, thus allowing the fluid clutch to operate the drive, but by throwing the lever to the last notch and shifting the collar to the full extent of its motion the lug will enter the notch and complete the positive engagement. Whenever quick variations of speed are needed the parts can be run under the liquid clutch alone; for full continuous speed the positive clutch may be thrown in to lock the driving and the driven elements together.

The chambers and the passages within the casing are practically filled with oil or other liquid, a slight space being left unfilled to allow room for the change in capacity incident to the entry of the pistons into the chambers. Such change, however, is slight, inasmuch as after passing certain points on the abutments the fluid flows into the recessed portion of the pistons sufficiently to equalize the capacity.

In operation the clutch casing rotates with the driving shaft, and, the oscillating valves being opened, the pistons travel or roll around in the chambers *g* through the action of the ring and spur gears and by their movement force the fluid around through the passages connecting the abutments, without movement of the driven parts. Closing the valves more or less obstructs the passage of the fluid in a proportionate amount and the motion or variable speed will be transmitted to the hub and the driven shaft in proportion to the extent of the closure of the valves.

Another application of this clutch is to use it as a brake by fixing one of the parts and operating the valves to bring the other to rest. While this clutch has been designed primarily for use on automobiles, it is not restricted to that field, but can be applied to any drive requiring a positive clutch, such as connecting a dynamo directly to a gas engine or for use in a motor launch.

## New Tools and Appliances

**Cold Cutting Circular Metal Saws.**—The Simonds Mfg. Company, Fitchburg, Mass., has recently begun the manufacture of circular metal saws for cold cutting for machines of all descriptions. The material used in the construction of these saws is a special type steel, and is said to possess the advantage of longer runs or faster feed, or frequently both. Side clearance of these saws is obtained by grinding from the teeth toward the center, which is said to insure perfect clearance until the saw is worn out. These saws are made in different sizes, ranging from 8 to 36 in. in diameter, with the ordinary thicknesses.

**Twenty-In. Upright Drill.**—J. E. Snyder & Son, Worcester, Mass., have recently brought out a new design of 20-in. upright drill which is of the same general design as the 21-in. model illustrated and described in *The Iron Age* April 29, 1909. The construction is, however, somewhat heavier, and the main column, the arm supporting the table and the base are more rigidly designed. The spindle may be traversed either by a hand wheel or a lever and ratchet, is counterbalanced by a weight inside the column and has quick return motion.

**Moline Multiple Spindle Drill Press.**—A new design of multiple spindle drill press has been recently added to the line of the Moline Tool Company, Moline, Ill. The maker's regular double spiral drive is used on the machine, but in place of a table feed it is equipped with an all spur gear spindle feed so arranged that it can be tripped automatically. The machine is so designed that in addition to an automatic stop each spindle has an in-

dependent speed which is easily controlled. The spindles are counterbalanced and may be rapidly traversed by hand. The drill press has a capacity for drills up to 2 in. in diameter in steel, and the maximum and minimum center to center distances are 5 ft. and 6 in. Bronze bushings are provided for the spindles to run in, and the feed racks are cut from the solid in the spindle quill and are also bronzed bushed. Ball thrust bearings and back gears are also provided.

**An Open Side Planer.**—The Cleveland Planer Works, Cleveland, Ohio, has recently added to its line of open side planers a 60 x 84 in. machine arranged with an outside column, which can be employed to support a fourth head when such an addition can be advantageously utilized. This column is not intended as a stiffener for the cross rail which in common with the bed and the column is of box section, giving a stiff and strong construction. The cross rail, which is raised and lowered by power, has an extremely broad bearing on the face of the column to which it is square gibbed. It is possible to operate the heads from either side of the machine, and automatic feeds are provided in all directions. The side head has a large bearing on the column and can be lowered out of the way when it is desired to use the rail heads close to the table. The table is provided with T-slots and holes at frequent intervals which are not bored through. Phosphor bronze bushings are provided for all the bearings and can be easily removed when worn without interfering with the alignment of the machine in any way. All the gearing in the running parts can be removed from the sides of the machine so that repairs can be easily made.

**Belt Shifter.**—The International Belt Shifter Company, 624 Vance street, Toledo, Ohio, has brought out a combination belt shifter which in addition to shifting the belt retains it when in the off position, thus completely disengaging the belt from the shaft pulley. The apparatus consists of a frame similar in form to a segment of the pulley rim. Projecting from the curved portion of this frame toward the pulley are a number of spindles carrying rollers which form a support for the belt when the latter is shifted, thus performing the function of the ordinary idler pulley. The belt shifting mechanism consists of two shift bars mounted in brackets and from which project rollers for engaging the belt. The front shift bar moves the belt from the driving pulley to the retaining rollers, while the rear one shifts it back. The shifters are operated by pull chains and are automatically returned to their original position by springs.

**New Acme Turret Lathe.**—A line of turret lathes intended especially to withstand the strains incident to the use of high speed steels has been recently brought out by the Acme Machine Tool Company, Cincinnati, Ohio. They are furnished with or without a power feed to the turret, and also with or without an extra capacity automatic chuck. It is of the friction geared type and the back gears are engaged or thrown out without stopping the machine. A wide face three-step cone pulley is provided and two spindle speeds are available for each step. The hexagonal turret has a hole through the central stem of the same diameter as the tool holes which are tapped for bolting tools to the turret faces. Independent adjustable stops are provided for each hole of the turret, and these can be shifted to permit a slight movement beyond the stop when desired without disturbing the adjustment. A geared power feed is furnished for the turret and four rates of feed are instantly obtainable by shifting a lever. Sufficient distance is provided between the center of the turret and the top of the slide for large dies and turret tools to be swung.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, placed its new furnace C in operation August 16. This furnace is of the same size and type as its other two new furnaces, each being of 500 tons capacity daily, and the blowing in was under very favorable conditions. Furnace B, which has just finished a run of 21 months, was blown out August 13 for relining, not to be blown in again until sufficient business has been accumulated to justify it.

# CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought are given elsewhere in our weekly market report.

## IRON AND STEEL— Bar Iron from store—

|  |        |
|--|--------|
| <b>Refined Iron:</b>                       |        |
| 1 to 1½ in. round and square.....          | ¢ 1.90 |
| 1½ to 4 in. x ½ to 1 in.....               | ¢ 2.10 |
| 1½ to 4 in. x 1 to 1½ in.....              | ¢ 2.10 |
| Rods—¾ and 1-16 round and square.....      | ¢ 2.10 |
| <b>Angles:</b>                             |        |
| 3 in. x ½ in. and larger.....              | ¢ 2.10 |
| 3 in. x 3-16 in. and ½ in.....             | ¢ 2.30 |
| 1½ to 2½ in. x ½ in.....                   | ¢ 2.10 |
| 1½ to 2½ in. x 3-16 in. and thicker.....   | ¢ 2.10 |
| 1 to 1½ in. x 3-16 in.....                 | ¢ 2.30 |
| 1 to 1½ in. x ½ in.....                    | ¢ 2.30 |
| ¾ x ½ in.....                              | ¢ 2.30 |
| ¾ x ½ in.....                              | ¢ 2.30 |
| ¾ x 3-16 in.....                           | ¢ 2.30 |
| <b>Tees:</b>                               |        |
| 1 in.....                                  | ¢ 2.60 |
| 1½ in.....                                 | ¢ 2.60 |
| 1½ to 2½ x ½ in.....                       | ¢ 2.15 |
| 1½ to 2½ x 3-16 in.....                    | ¢ 2.35 |
| 3 in. and larger.....                      | ¢ 2.15 |
| <b>Beams:</b>                              |        |
| Channels, 3 in. and larger.....            | ¢ 2.10 |
| Hande—1½ to 6 x 3-16 to No. 8.....         | ¢ 2.30 |
| "Burdens Best" Iron, base price.....       | ¢ 2.15 |
| Burdens "H. B. & S." Iron, base price..... | ¢ 2.35 |
| Norway Bars.....                           | ¢ 3.00 |

## Merchant Steel from Store—

|  |        |
|--|--------|
| Bessemer Machinery.....                        | per lb |
| Toe Calk, Tire and Sleigh Shoe.....            | ¢ 1.90 |
| Best Cast Steel, base price in small lots..... | ¢ 3.00 |

## Sheets from Store—

|                    |          |
|--------------------|----------|
| <b>Black</b>       |          |
| One Pass, C.R.     | R. G.    |
| Soft Steel.        | Cleaned. |
| No. 16.....        | ¢ 2.90   |
| No. 18 to 21.....  | ¢ 3.00   |
| No. 22 and 24..... | ¢ 3.10   |
| No. 26.....        | ¢ 3.20   |
| No. 28.....        | ¢ 3.30   |

## Russia, Planished, &c.

|   |                       |
|---|-----------------------|
| Genuine Russia, according to assort-<br>ment..... | ¢ 12 @ 14½            |
| Patent Planished, W. Dewees Wood.....             | ¢ 10 @ 12; B. 9¢ net. |

## Galvanized.

|                   |        |
|-------------------|--------|
| No. 14 to 16..... | ¢ 3.30 |
| No. 22 to 24..... | ¢ 3.55 |
| No. 26.....       | ¢ 3.75 |
| No. 28.....       | ¢ 4.10 |

No. 20 and lighter ¾ inches wide, 25¢ higher.

## Genuine Iron Sheets— Galvanized.

|                    |        |
|--------------------|--------|
| No. 22 and 24..... | ¢ 5.75 |
| No. 26.....        | ¢ 6.25 |
| No. 28.....        | ¢ 7.25 |

## Corrugated Roofing—

|                        |                      |        |
|------------------------|----------------------|--------|
| 2½ in. corrugated..... | Painted              | Galv'd |
| No. 24.....            | ¢ 100 sq. ft. \$3.85 | 4.50   |
| No. 26.....            | ¢ 100 sq. ft. 2.95   | 4.00   |
| No. 28.....            | ¢ 100 sq. ft. 2.60   | 3.75   |

## Tin Plates—

### American Charcoal Plates (per box.)

|                             |        |
|-----------------------------|--------|
| <b>"A. A. A." Charcoal:</b> |        |
| 1C, 14 x 20.....            | ¢ 5.35 |
| 1X, 14 x 20.....            | ¢ 7.60 |

### A. Charcoal:

|                  |        |
|------------------|--------|
| 1C, 14 x 20..... | ¢ 5.40 |
| 1X, 14 x 20..... | ¢ 6.50 |

### American Coke Plates—Bessemer—

|                  |        |
|------------------|--------|
| 1C, 14 x 20..... | ¢ 5.40 |
| 1X, 14 x 20..... | ¢ 5.40 |

### American Terne Plates—

|  |         |
|--|---------|
| 1C, 20 x 28 with an 8 lb. coating..... | ¢ 8.50  |
| 1X, 20 x 28 with an 8 lb. coating..... | ¢ 10.50 |

### Seamless Brass Tubes—

|                             |                |
|-----------------------------|----------------|
| List November 14, 1908..... | Base price 18¢ |
|-----------------------------|----------------|

### Brass Tubes, Iron Pipe Sizes—

|                             |                |
|-----------------------------|----------------|
| List November 13, 1908..... | Base price 18¢ |
|-----------------------------|----------------|

### Copper Tubes—

|                             |                |
|-----------------------------|----------------|
| List November 13, 1908..... | Base price 22¢ |
|-----------------------------|----------------|

### Brazed Brass Tubes—

|                          |      |
|--------------------------|------|
| List August 1, 1908..... | 19½¢ |
|--------------------------|------|

### High Brass Rods—

|                          |      |
|--------------------------|------|
| List August 1, 1908..... | 14½¢ |
|--------------------------|------|

### Roll and Sheet Brass—

|                          |      |
|--------------------------|------|
| List August 1, 1908..... | 14½¢ |
|--------------------------|------|

### Brass Wire—

|                          |      |
|--------------------------|------|
| List August 1, 1908..... | 14½¢ |
|--------------------------|------|

### Copper Wire—

|                 |                       |
|-----------------|-----------------------|
| Base Price..... | Carload lots mill 14¢ |
|-----------------|-----------------------|

### Copper Sheets—

|  |     |
|--|-----|
| Sheet Copper Hot Rolled, 16 oz. quantity lots..... | ¢ 8 |
|--|-----|

|   |     |
|---|-----|
| Sheet Copper Cold Rolled, 16 oz. quantity lots..... | ¢ 8 |
|---|-----|

|  |     |
|--|-----|
| Sheet Copper Polished 30 in. wide and under, 16 oz. square foot..... | ¢ 8 |
|--|-----|

|   |     |
|---|-----|
| Sheet Copper Polished over 30 in. wide, 20 oz. square foot..... | ¢ 8 |
|---|-----|

|  |     |
|--|-----|
| Planished Copper, 16 oz. square foot more than Polished..... | ¢ 8 |
|--|-----|

## METALS— Tin—

|                  |            |
|------------------|------------|
| Straita Pig..... | ¢ 20 @ 22½ |
|------------------|------------|

## Copper—

|                   |            |
|-------------------|------------|
| Lake Ingot.....   | ¢ 14½ @ 15 |
| Electrolytic..... | ¢ 14½ @ 15 |
| Castings.....     | ¢ 14½ @ 15 |

## Spelter—

|              |          |
|--------------|----------|
| Western..... | ¢ 6 @ 6½ |
|--------------|----------|

## Zinc.

|                         |          |
|-------------------------|----------|
| No. 9, base, caulk..... | ¢ 8 @ 8½ |
|-------------------------|----------|

## Lead.

|                   |          |
|-------------------|----------|
| American Pig..... | ¢ 5 @ 5½ |
|-------------------|----------|

## Solder.

|                          |           |
|--------------------------|-----------|
| 1½ & 1½, guaranteed..... | ¢ 22 @ 23 |
|--------------------------|-----------|

|            |            |
|------------|------------|
| No. 1..... | ¢ 19 @ 19½ |
|------------|------------|

|              |             |
|--------------|-------------|
| Refined..... | ¢ 17½ @ 17½ |
|--------------|-------------|

Prices of Solder indicated by private brand vary according to composition.

## Antimony—

|              |           |
|--------------|-----------|
| Cookson..... | ¢ 20 @ 21 |
|--------------|-----------|

|               |           |
|---------------|-----------|
| Halletts..... | ¢ 20 @ 21 |
|---------------|-----------|

|                   |           |
|-------------------|-----------|
| Other Brands..... | ¢ 20 @ 21 |
|-------------------|-----------|

## Bismuth—

|             |                |
|-------------|----------------|
| Per lb..... | \$2.00 @ \$2.5 |
|-------------|----------------|

## Aluminum—

|   |            |
|---|------------|
| No. 1 Aluminum (guaranteed over 99% pure), in ingot<br>for remelting..... | ¢ 19 @ 19½ |
|---|------------|

|                  |               |
|------------------|---------------|
| Rods & Wire..... | Base Price 24 |
|------------------|---------------|

|             |               |
|-------------|---------------|
| Sheets..... | Base Price 20 |
|-------------|---------------|

## Old Metals.

|   |       |
|---|-------|
| Dealers' Purchasing Prices Paid in New York | Cents |
|---|-------|

|                                     |                 |
|-------------------------------------|-----------------|
| Copper, Heavy cut and crucible..... | ¢ 10.75 @ 11.00 |
|-------------------------------------|-----------------|

|                             |                 |
|-----------------------------|-----------------|
| Copper, Heavy and Wire..... | ¢ 10.50 @ 10.75 |
|-----------------------------|-----------------|

|                                |               |
|--------------------------------|---------------|
| Copper, Light and Bottoms..... | ¢ 9.50 @ 9.75 |
|--------------------------------|---------------|

|                   |               |
|-------------------|---------------|
| Brass, Heavy..... | ¢ 7.25 @ 7.50 |
|-------------------|---------------|

|                   |               |
|-------------------|---------------|
| Brass, Light..... | ¢ 5.75 @ 6.00 |
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| Heavy Melchior Composition..... | ¢ 9.50 @ 9.75 |
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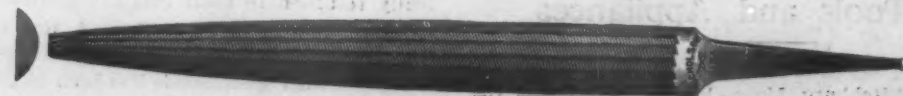
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| Clean Brass Turnings..... | ¢ 7.00 @ 7.25 |
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| Composition Turnings..... | ¢ 6.25 @ 6.50 |
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|                  |               |
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| Lead, Heavy..... | ¢ 4.00 @ 4.25 |
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| Lead, Test..... | ¢ 3.50 @ 3.75 |
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| Zinc Scrap..... | ¢ 3 @ 3.25 |
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